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An investigation into the use of a microblogging technology in school trips to museums

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BSc (Hons) Primary Education
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Thesis presented for the degree of Doctorate in Philosophy

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07 April 2015

Declaration

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

Koula Charitonos

Abstract

School trips to museums are an important means of introducing young people to museum collections and may have a long-term learning impact (Falk & Dierking, 1997). At the same time, activities in museum spaces can be challenging for students who are engaged in complex learning processes. The thesis considers the use of a microblogging technology (Twitter) by a Year 9 History class (13-14s) from a secondary school in Milton Keynes during a trip to the Museum of London (<http://www.museumoflondon.org.uk/>). It draws on the view that mobile technologies can create a continuity of the learning experience despite changes in the physical and social context (Sharples, 2015) and contributes to the body of research on how such technologies can best support young people's visit experience and extend it beyond the museum.

The thesis is informed by sociocultural perspectives of learning with a focus on mediating artefacts in the development of understanding in situated learning activities. It draws on the Contextual Model of Learning which views the visit experience in relation to meaning making and situates this in visitors' personal, physical and sociocultural contexts (Falk & Dierking, 2000). This research employs a case-study methodology and adopts a research design that involved a pre- and post-visit approach. Evidence of students' activity in the museum and the classroom while using Twitter is considered. The findings are based on video analysis (Ash, 2007), analysis of questionnaires, interviews and personal meaning maps (Falk et al., 1998).

Evidence reveals that the use of microblogging reconfigures the museum space by creating an 'interconnected space'. Evidence also shows that the content generated by the students was 'designed' for an audience and offered opportunities for new ways of engagement with objects within the context of a semi-formal visit. The analysis illustrates that prominent practices in the museum were 'live' communication, documentation and sharing, while in the classroom the microblogging supported the students to connect to meanings made in the museum by providing prompts for reflection and recollection. Learners were able to weave everyday informal practices related to the use of Web 2.0 technologies with formal museum visiting practices. However, the analysis also points out that learners faced some threats in the continuity of their experience and the development of their trajectories of meaning making as reflected in the three types of visit experience: the 'focused', the 'hybrid' and the 'floating'.

Drawing on this evidence, the thesis makes a distinction between 'microblogging as a tool', 'microblogging as a space to create, review and share content' and 'microblogging as a practice'. The thesis also points to three intertwined areas of consideration for designing learning activities across contexts. These areas include: the technological properties of the tools in use, the types of activity the tools support and specific practices associated with the tools and the contexts. This work essentially contributes to the contemporary discourse around studying 'seamless learning spaces' (Chan et al., 2006) and has implications in designing approaches for technology-enhanced learning in museums.

Acknowledgments

It's been a long journey. Hard at times, but mostly joyfully pursued.

I dedicate this thesis to my family. They never doubted I could do it—they only wondered why it took so long. I would not have got even halfway there without their on-going support. *Ευχαριστώ!*

Many people deserve special thanks for helping me get this work done.

My supervisors, Prof Eileen Scanlon, Dr Ann Jones and Dr Canan Blake, for their continuous guidance and advice. Without their help I would not have been able to complete the thesis.

Many thanks to Prof John Richardson for his feedback on a draft of this thesis. I'm also grateful to Prof Kevin McConway for his advice on approaches to data analysis.

A big thanks to the members of the staff at the Museum of London, who supported this research to varying degrees. My appreciation also goes to the teachers for allowing me to conduct the pilot and the main study in their classes. The young participants in these studies certainly deserve my very greatest respect and thanks.

I am grateful to the Institute of Educational Technology, which provided the funding and the necessary resources to undertake this work. I have benefited considerably from the academic support provided by CREET. I'd also like to acknowledge the A.G. Leventis Foundation for funding my research.

I have been fortunate for the many friendships endured or formed along the way. I will probably never call Milton Keynes the 'City of Dreams', but over these years you all made it feel 'home abroad'.

To friends who proofread chapters—Artemis, Brian, Nineta, Maria, Marina, Myria, Phivi and Tina—thank you all and each one for your comments.

Finally, to my partner... Along the way there have been house moves, work commitments, commuting, stress... Life events got in the way. And then more thesis' work got in the way. THANK YOU for your patience, support, and encouragement.

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LIST OF ABBREVIATIONS

BECTA	British Educational Communications and Technology Agency	NMDC	National Museums Directors Council
BERA	British Educational Research Association	PC	Personal Computer
BYOD	Bring Your Own Device	PDA	Personal Data Assistant
DCMS	Department of Culture, Media and Sports	PI	Personal Inquiry
DfES	Department for Education and Skills	PMMs	Personal Meaning Maps
HE	Higher Education	RCMG	Research Centre for Museums and Galleries
ICT	Information and Communication Technologies	RQ	Research Question
IQR	Interquartile Range	SE	Significant Event
JISC	Joint Information Systems Committee	SNSs	Social Network Sites
KS	Key Stage	TEL	Technology-Enhanced Learning
MLA	Museums, Libraries and Archives Council	TLRP-TEL	Technology-Enhanced Learning Research Programme
MLC	Museum Learning Collaborative	UGC	User-generated content
MoEC	Ministry of Education and Culture	UK	United Kingdom
MoL	Museum of London		

LIST OF WEBSITES

Compendium	http://compendium.open.ac.uk/
Elan	http://tla.mpi.nl/tools/tla-tools/elan/
Flickr	https://www.flickr.com/
Futurelearn	http://futurelearn.com/
ICOM	http://icom.museum/
Leventio Municipal Museum	http://www.leventismuseum.org.cy/
MiniTab	http://www.minitab.com
Museum of London	http://museumoflondon.com
Twitter	http://twitter.com
Tate Tales Blog	http://blog.tate.org.uk/tate-tales/
Technology-Enhanced Learning Research Programme (TLRP-TEL)	http://www.tel.ac.uk/
Vuvox	http://vuvox.com (discontinued as of September 2013)
Zydeco	http://zydeco.soe.umich.edu/

CHAPTER 1

INTRODUCTION

This thesis considers the potential of social and mobile technologies—and particularly of a microblogging technology—to support museum visitor experiences. It views the visitor experience as “a process of remembering and connecting” (Silverman, 1995, p.162), “assimilating and integrating one’s experiences into new ways of understanding, thinking, and acting” (Rennie & Johnston, 2004, p.7). Furthermore, it highlights the role of artefacts and new technologies in mediating such a process.

The starting point of this work is that any visit to a museum involves encounters with artefacts. For a visitor, an encounter and engagement with an artefact might reinforce or transform the already established meanings and allow new meanings and knowledge to be produced (Kress, 2010). Considering this, this thesis attends to meanings made during a school visit to a museum, which are represented and/or communicated both face-to-face and online. Particular emphasis is placed on visitor-generated content and face-to-face interactions. It is argued that by looking at user-generated content, a sense of how students interact with artefacts and how they make sense of their experience, can be captured. As a result, the analysis focuses on interactions among students as well as on the use of a microblogging technology (Twitter) to provide interpretations of things experienced during the visit. In this work every ‘thing’, ‘resource’ or ‘artefact’ (e.g. tweet, talk, objects)

students encounter in the learning environment may have a key role in the learning process.

The thesis also highlights a learning design that acknowledges several dimensions characterising activities for mobile seamless learning, as are identified by Wong and Looi (2011). The learning design takes place across time and locations and encompasses formal and semi-formal learning, as well as physical and digital worlds to extend the social spaces where learners interact with each other. It allows the learners to use multiple devices and a variety of resources and switch between different formations (i.e. individual, group, class-wide). In other words, the research design involves an interplay between all these dimensions combined with multiple learning tasks in order to gain an understanding of how microblogging contributed to the learners' experience. In this design, the museum is viewed as a key activity setting in a long trajectory of whole class activities with specific goals that span over several sessions in both the museum and the classroom. It is proposed that by examining activities across settings an understanding is gained of how content, generated by learners themselves, becomes constituted as an effective resource for a learner's museum experience. It is also envisioned that such an investigation will shed light into how the design, alongside the features of a microblogging technology, encourages and facilitates the generation of content that can be carried across settings.

Overall, the thesis examines the connections made between events, settings and ideas over time. It investigates whether such connections are negotiated in students' talk and in artefacts they create and how this process is mediated by the use of technologies. In doing this, the thesis contributes to contemporary discourse on designing and studying 'seamless learning spaces' (Chan et al., 2006), i.e. extending learning sessions, ideas and experiences

across environments and contexts. Furthermore, it explores new characteristics of visitor participation, especially with regards to formal visits to museums, that could be emerging within the current advent of Web and mobile technologies.

What follows is an account of the motivation for undertaking the work presented in this thesis (Section 1.1). The chapter situates this work within a broader research context, by providing some contextual information before offering an account regarding the problem that the thesis aims to address (Section 1.2). A ‘road map’ of this piece of work (Section 1.3) and definitions of the key terms that the reader will encounter in the thesis are also provided (Section 1.4). Finally, a synopsis of the thesis’ key contributions is also provided (Section 1.5).

1.1 RESEARCH MOTIVATION

This thesis is motivated by an interest in gaining an understanding of how best to support school trips to museums. An important question is how can mobile technologies support the mobility of ideas and resources across museums and classrooms, and contribute to students’ attempts to make sense of their experiences? In my experience as a primary school teacher school trips were an important means of introducing young people to museum collections and artefacts. The trips may have had a long-term learning impact (Falk & Dierking, 1997) and may have also influenced perceptions. At the same time, I could see a gap between an experience that a young person has during a visit to a museum as a leisure activity and during a school trip. Due to the way school visits are usually organised (i.e. teacher-led, highly structured) they challenge notions of ‘free-choice’ experience (Falk & Dierking, 2000). In addition, museums can be quite challenging spaces for young people, as they are often filled with a range of diverse artefacts, too much

information and use of highly intellectual language. As a result, some students are disengaged and some might actively resist going back to museums as adults. Therefore, a challenge a teacher faces when planning and organising school trips to museums is to ensure that students have an enjoyable and positive experience. Another challenge is to ensure that the activities taking place in the museum and the concepts involved are connected to activities or concepts learnt in the classroom and have relevance to students' lives. In other words, a key challenge for teachers, also identified by Littleton and Kerawalla (2012), is how to ensure that the overall educational experience for the students is one that is genuinely cumulative and reciprocal, rather than simply extended in time.

I strongly believe that museums are a good place to experiment with and research new technologies, offering an environment where learning opportunities are in abundance. The exciting potential offered by new media for “informing us and reconfiguring our relations with objects, spaces and each other” (Beer & Burrows, 2007) is yet to be fully explored. This particular learning context challenges us to consider further the relationships and interactions between communication and learning. It also challenges us to explore how these may shift with the emergence and prevalence of social and mobile technologies. However, an on-going problem for museums (and schools) is how to support and develop interpretation skills in young people, as they are often ‘new’ to this practice and lack the opportunity (in schools or museums) to converse, argue and debate face-to-face in order to develop such skills. This was the starting point in a study I undertook in 2009, which was concerned in exploring the potential that art museum Web sites have in enhancing and extending school-based practice. This study found that positive attitudes towards art and museums, as well as ‘interpretive skills,’ are key for children in experiencing meaningful online visits in art museums and in getting engaged with the museum (Charitonos, 2010).

In the same work, content created by students themselves (i.e. ‘artcasts’), could be seen as a tool in engaging children with objects and the online museum successfully. One issue highlighted in this study was the social aspect of interpreting artworks, since the process of interpreting an artwork that started as individual reflection and led to group discussion (i.e. collective ‘group’ interpretation) was noted.

Following on from this work, and drawing on expertise gained in roles I took over the last few years (i.e. researcher, teacher, museum staff, visitor), I developed a strong interest in investigating how social and mobile technologies shape practices and learning processes for young people, in and across settings. The starting point was that it is not sufficient to approach learning spaces afforded by technologies as copies of face-to-face classroom settings. Alongside this, my concern was to develop a research design to allow more flexibility regarding time and space, incorporate new tools into pedagogical practices and use resources that are generated by learners themselves. I further sought to highlight the social aspects of interpretation and examine whether it was possible to have an artefact generated by students during a school trip (e.g. post, photo) to act as a prompt for other students’ work across learning environments and time, i.e. further interpretations or reflective comments around objects. Such a visit design, in line with the research questions this thesis aim to address (see Section 1.2), would enable learners to make their own connections with each other, reflect, as well as make selections of sources they find relevant to their own learning and carry them to other settings.

It is believed that technologies increasingly allow ubiquitous access to vast amounts of knowledge and learning is ‘performed’ based on what sources students find relevant in the setting (Säljö, 2010). Therefore, this work draws on the view that technologies may offer

the means for making connections between the museum and the classroom, bridge the gaps between formal and informal visits, and create appropriate conditions for learning to take place. The thesis is therefore motivated by a desire to investigate ways to utilise a microblogging technology for more than information delivery, through valuing content generated by learners themselves and by mediating and contributing to a learner's trajectory.

1.2 RESEARCH CONTEXT

Recent studies (Lenhart et al., 2007; Livingstone et al., 2011; Nielsen, 2011) portray today's teens and young people (18-29s) as being 'always online', while they perceive themselves as tech-savvy/Internet-savvy and show preference for technology enhanced communication channels. Indeed, more than ninety percent (90%) of teens and young adults in the U.S. use the Internet (Lenhart et al., 2007), while similar findings are reported in the United Kingdom (UK), e.g. over ninety percent (90%) of children aged 5-15 have access to the Internet, and over eighty percent (80%) of them use it at home (OfCom 2012). Top in their online activities are visits to social networks (Livingstone et al., 2011; Ofcom, 2011). OfCom (2011) reports a third (34%) of 8-12s to have a profile on sites that require users to register as being 13 or over, and forty-seven percent (47%) of 10-12s to have a profile on social networking sites. What can be noted in the same report is that in a typical week, 8-11s spend 8.4 hours and 12-15s spend 15.6 hours on the Internet, which indicates that compared to previous studies the amount of time spent online has risen. Such statistics are now combined with a reported increase in the use and ownership of mobile phones among children and young people (Lenhart, 2009; OfCom, 2011). In the UK, the percentage of children owning a smartphone is thirteen percent (13%) among 8-11s, and around thirty-five percent (35%) among 12-15s (OfCom, 2011), while a tendency for an

increase in ownership is reported. As a result, it is suggested that Internet use among 9-16s is increasingly individualised, privatised and mobile (Livingstone et al., 2011).

Arguably, the implications of this are profound. Web and mobile technologies have become a pervasive part of everyday life in much of the world, and are growing everywhere.

Research not only suggests that the Internet has become a key medium for children and young people who have access to digital technologies and the basic skills to use it, but also that the Internet and computer-mediated communication shape many aspects of young people's lives, such as social relationships, social practices and identity (e.g. see Ito et al., 2009). For Crook (2008)

this is largely about making more opportunities for the user to publish and communicate. It is about uploading rather than downloading. About coordination, rather than delivery. So, for learners: it's about more audience, more collaboration, more resource. (p.30)

As a result, learning activities as practised in schools are being challenged by the developments of Web and mobile technologies and the characteristics outlined in the quote above, with Säljö (2010) stressing that the technologies “do not merely support learning; they transform how we learn and how we come to interpret learning” (p.53).

Whereas social media have become an important part of most young people's lives, it is also recognised that these relationships are formed primarily ‘in the domain of popular culture’ (Buckingham, 2007a)—in ‘affinity spaces’ (Gee, 2004)—but not in schools.

Therefore, examining how learning occurs within the context of young people's activities on social network sites (SNSs) with mobile technologies—how knowledge is produced, ideas evolve and distributed through interaction—might contribute to gaining an

understanding of their experiences, cultures and communication practices, which can then be built within formal learning programmes. However, it should be noted that the argument that the informal use of technology can be harnessed for use in formal contexts has been criticised (Crook, 2012b). This argument is neither to imply a superiority of learning taking place outside school nor that formal learning is inherently ‘bad’. Rather, it is based on a growing evidence of a gap between children’s everyday cultures and practices outside school, which are increasingly media-saturated, and those they encounter in the classroom (Crook et al., 2008). I would therefore argue that researchers, schools and educators have a responsibility to consider and address aspects of popular culture and uses of technology beyond school.

Over the last decade there has been a massive investment in technology across schools in England (e.g. see DfES 2005; Becta 2009), stemming from a belief that technology will bring positive change and will make educational provision better. The focus of such governmental initiatives was, on the one hand, on providing the infrastructure, and on the other hand on developing a curriculum (ICT) to provide technical know-how and functional skills to students. Yet, despite the infrastructure being available, it is true that little of what takes place in the classroom is actually done with technology, and as a result Selwyn (2011a) argues that fundamental elements of teaching and learning in formal educational settings remain largely unchanged by the introduction of technology. However, technology should neither be viewed as precipitating change in and of itself nor as a panacea for all issues education currently faces. In this thesis technologies are not “neutral mechanisms for delivering information... independently of human or social interests” (Buckingham, 2007b). Rather, they are viewed as forms of communication, and overall my aim is to highlight the social aspects of the use of technologies and address

questions about how technologies mediate representations of learning and the production of meanings. My work attributes particular importance to how technologies are integrated in learning activities taking place in authentic contexts. Viewing context as created by interactions among people, their surrounding environment, and the tools or resources available to them (Sharpley et al., 2009a), the thesis will examine contexts that are important for ubiquitous and networked learning based on learning designs that draw on pedagogy rather than on the technology itself, i.e. blended and peripheral use, trying to add value to specific activities (e.g. collecting evidence in a museum space, valuing user-generated content).

As in the education sector, the landscape for the cultural sector is rapidly changing, although “cultural and heritage organisations have been slow, by and large, to respond to these changes” (Stack, 2010). Almost a decade after Hawkey (2004) was wondering whether learning in museums has a real future or only a virtual one, and despite the various initiatives undertaken in the sector, there is no consistency in how the museum sector uses the Web and digital media. Clearly, not all museums are using them equally well, which is evident within and across countries. In fact, fears have been expressed that museums may be caught in a ‘technology trap’, referring to the danger of museums pursuing technology for its own sake (Sola; cited in Parry 2005, p.334).

The key implication for museums—as for schools and learners—is that the Internet and various digital developments have shifted their visitors’ expectations. Hazan (2007) argues that “visitors’ expectations are now more complex and sophisticated... and members of public no longer simply see themselves as passive learners” (p.140). The *Horizon Report: Museum Edition* (Johnson et al., 2012) highlights the need for museums to embrace

opportunities provided by the use of digital resources to enhance multimodal learning and interpretive delivery, both online and in the galleries. As a result, current debates in the sector call for museums (and other cultural organisations) to respond to this shift in audience expectations.

Simon (2010) advocates a 'participatory museum' and, alongside this, Bearman and Geber (2008) put forward the idea of the 'museum as a platform' (p.386) or what Proctor (2010) calls a 'distributed network', where audiences will access the museum content beyond the physical site and the website. The 'museum as a platform' challenges perceptions about the role of museums, such as the notion of 'museum as an authority' (see Section 2.3.1 for a detailed analysis). It also highlights that museum practices should be audience-driven and based on partnerships. It is true that such claims coincide with developments in the Web and digital area. However, according to Mason and McCarthy (2008), an audience-driven approach should depend less on technology and more on the 'culture of new media' (p.78). The two researchers, in fact, claim that the museum sector lacks a strategy and research into the 'culture of new media' (p.63). What is more, a shift in practices should not be limited to the way the content is delivered to audiences (i.e the same content in different devices/digital form). Rather, it has to take place in the 'style of communication' (Maculan, 2008) or in other words, in the styles of interpretive delivery.

The research presented in this thesis is framed by an interest in the ways in which the future museum is increasingly conceptualised as extended beyond museum walls along with its implications. Yet, with research around new media and museums still emerging, little is currently known about the nature, scope and implications of this fast but uneven uptake of new media in museums. Even less is known about applications and implications

for museum learning, where educators and museum staff need to coach visitors in finding, interpreting, and making their own connections with collections and ideas.

In sum, my work embraces the view that learning will increasingly take place outside the classroom and in the learner's environments, both real and virtual. The challenge will be to discover how to use Web and mobile technologies to create seamless learning across temporal and spatial contexts. I foreground the significance of "fostering learners' habits of mind" (Wong, 2012, p.22) and skills in identifying and appropriating resources, including technological tools, to mediate their learning activities in any learning setting. At the same time, I acknowledge that the introduction and use of technologies may change practices in unpredictable ways or may create tensions in current practices in classrooms and museums. However, new knowledge also emerges, which, alongside such tensions and competencies, needs to be investigated in empirical studies.

Following on from this, this thesis aims to contribute to this field of inquiry and provide empirical evidence to address the following research questions (RQs):

RQ1: How does the use of microblogging with photographs contribute to the students' experience during a museum visit?

RQ2: How does the use of microblogging with photographs mediate the students' connections between classroom and museum activities, both before and after a museum visit?

1.3 OVERVIEW OF THE THESIS

This thesis describes the detailed findings from a case study examining the use of microblogging in a school visit to a museum. This section outlines the organisation and content of all the chapters in the thesis. The flow of the chapters is depicted in Fig. 1.1. This thesis consists of eight chapters, including this introductory chapter. A literature review follows (Chapter 2), divided in two parts: the focus of the first part is on literature around Web 2.0 technologies in the context of formal education, and their potential in mobile and seamless learning. Research on Twitter is central in this part. The second part reviews a body of literature on museums and technology. Particular emphasis is given to museum learning, and meaning making and the role of social interaction and artefacts in meaning making. Also, a review of key projects in technology-enhanced museum learning (TEL-museums) is provided. Chapter 2 concludes with a discussion on ethical considerations around the use of social and mobile technologies.

Chapter 3 outlines the theoretical framework, which underpins the work and shapes the answers provided to the research questions. The concept of ‘trajectory’ and the ‘Contextual Model of Learning’ are discussed, while perspectives on the mediation by artefacts are provided.

Chapter 4 discusses the research methodology, and particularly the rationale for conducting this research study and for choosing the case study as a research methodology. It explains in detail how methods were selected and framed to make the theoretical framework operational. This chapter concludes with a discussion on the methods employed for the data analysis.

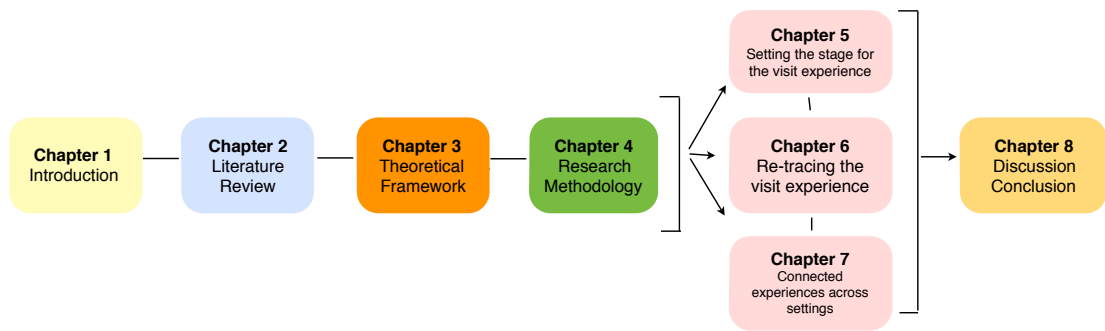


Figure 1.1 A diagrammatic representation of thesis' chapters

Chapter 5, Chapter 6 and Chapter 7 that follow provide empirical evidence to answer the two research questions stated in the previous section of this chapter. Chapter 5 focuses on pre-visit activities that aimed to set the stage for the museum visit and were used principally to prime the students for the museum experience. The data presented in this chapter were mainly collected in the classrooms and comprise of face-to-face and computer-mediated interactions, questionnaire data and observation data. Chapter 5 contributes evidence for RQ2.

Following from Chapter 5, Chapter 6 focuses on the visit experience. The first part of the chapter focuses on the analysis of the tweets posted during the visit. The second part documents how different types of visit experience unfolded during the visit based on the data collected for each group. The primary aim of the chapter is to represent and analyse the actions, practices and interactions during the visit. The data presented in this chapter comprise of face-to-face and online interactions, video data, observation notes and user-generated data (e.g. photos). This chapter provides evidence for RQ1 and RQ2.

Chapter 7 emphasises learner content creation in the classroom context (post-museum activity context) and provides evidence for RQ1 and RQ2 in that it examines whether

artefacts/objects and tools encountered or used during the activities inform students' artefacts and assist them in making connections across the settings. The data presented and analysed in this chapter are questionnaire data, group presentations, meaning maps and interview data.

The thesis concludes with Chapter 8. The chapter begins with a research summary and then re-visits the research questions by relating back to the literature. It includes a discussion about the main contributions that can be drawn from this research. This discussion covers the relevance of this work to educational technology and museum practice, as well as methodological and theoretical contributions. Finally, the thesis provides insights into the limitations of the research and directions for future research.

1.4 KEY TERMS AND DEFINITIONS

This section defines some key terms that have been used throughout the thesis. First, it discusses some definitional issues around the term 'museum'.

Museum

The etymological origins of 'museum' can be traced in the ancient Greek word for cult sites devoted to the muses (i.e. 'mouseion'). Early museums (e.g. in Alexandria) were associated with knowledge dissemination or were devoted to displaying captured treasures (Barrett, 2012, p.46). The term can be traced again in the mid-seventeenth century, when one notes the predecessors of public museums in private collections of royalty or wealthy buyers/collectors (e.g. Sir Hans Sloane). The idea of 'museum', therefore, emerges from the 'private cabinet of curiosities' (Hooper-Greenhill, 1992) inside palaces or churches and is marked by the founding of the Ashmolean Museum in 1683, the opening of the British Museum in 1759, the State Hermitage in 1764 and the Louvre Museum in 1793. "The

creation of the Public Museum... generated enthusiasm for equality of opportunity in learning... In practice, the traditions of the former private collections were carried on in the public museums..." (Wittlin; quoted in Hein, 2011, p.342). The change from private collections of the late eighteenth century to the institutions we know today is a result of the attempts to situate museums in a broader cultural, political and economic context and challenge assumptions underpinning the concept of museum (for a summary see Barrett, 2012).

For at least three centuries (18th-20th century), the concept of museum has been underpinned by what has become known as 'modernist' assumptions. Such assumptions can be identified in the definition provided by the International Council of Museums (ICOM), which is to be used as the working definition of 'museum' in this thesis.

According to the International Council of Museums (ICOM) (1946) a museum is:

a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.

Examining this definition one may notice a focus on the museum as a building; the phrase a 'permanent institution' implies a physical place, whereas nowadays most (Western) museums also have a virtual space/online presence. Related to this is the perception of people visiting museums, meaning going to or 'being present' in the physical space—although, with Web developments visiting should not necessarily mean physically.

What is more, ICOM refers to museums as being ‘in the service of the society’ and hence, intended to serve the ‘public’. Within the museum context, though, the term ‘public’ is used rather loosely to invoke a generalised, homogeneous, body of people: audiences, communities, visitors or even non-visitors. Yet, which ‘publics’ museums serve and how relevant museums are for them are key questions, especially considering that museums have been criticised for not representing parts of this public (e.g. black ethnic minorities) or that the demographic profile of casual museum visitors has changed little since public museums were first established (McClellan; cited in Walker, 2010, p.23). This phrase in the definition, further, intends to convey the museum as an ‘open’, ‘democratic’ institution, relevant to people, and in this way to be seen as a valid and trusted source of information and knowledge. This view of the museum—and consequently of the curator— as both a ‘broadcaster’ and ‘authority’ has dominated the museum sector. However, ideas of authority and knowledge as described here have been recently criticised (e.g. see Hein, 1998; Hooper-Greenhill, 1999).

The final part of the ICOM definition refers to how a museum should operate. Here one notes an object-focus (tangible or intangible), where collection, classification and display are the main means of communication and fulfilment of the museum’s educational and enjoyment purposes. This point marks a distinction in relation to which institutions can be described as ‘museums’ and emphasises a museum as an educational institution. For the ICOM such a museum should explicitly provide and communicate educational information.

Falk and Dierking (2000) state that museums are ‘informal learning’ environments and term learning in museums as ‘free-choice’ learning—“learning that is intrinsically

motivated and reflects learning individuals do because they want to” (Falk et al., 2011, p. 324). Motivation and learner control are also highlighted in Livingstone’s (2006) definition of informal learning: “all forms of intentional or tacit learning in which we engage either individually or collectively without direct reliance on a teacher or externally organised curriculum” (p.204). However, my investigation involves a school visit to a museum. Whereas learning takes place in a museum, at the same time this visit is curriculum bound and follows certain degrees of structure. Therefore, this visit shares characteristics of formal and informal learning. Hence I prefer to use the idea of a museum as a semi-formal learning setting. This also relates to Kahr-Højland (2005) who situates museums between formal learning institutions, i.e. curriculum based or formally organised into a programme (e.g. schools) and places of ‘informal learning’, i.e. no explicit educational mission (e.g. amusement parks).

Finally, the ICOM definition includes art galleries, museums with historical collections of objects, as well as archives, botanic gardens, science centres, zoos, and heritage sites. The investigation presented in this thesis is not restricted to a particular museum or type of museum. The thesis examines the conduct and content generated by young visitors when engaged with objects and technologies in a museums space. Such an activity could be carried out across different types of museums, yet the focus of the investigation is restricted on a particular visitor, i.e. a young person taking part in a semi-formal visit. To narrow down further the scope of the investigation and facilitate some generalisations across various museum types as detailed in Chapter 8, the focus is restricted to museums based on collections of artefacts. Similar to Walker (2010), I view these as providing a wider scope for investigation in the form of material objects which are open to multiple

meanings and interpretations by enabling the visitor to be active in the process of meaning construction.

Web 2.0 technologies

‘Web 2.0’ is a term that describes a number of recent Internet applications including social network sites, wikis, blogging, microblogging, video/picture sharing and others. Whereas these applications differ in form and function, they all share a common attribute, in that users can interact and collaborate with each other (individually and in groups) both as creators and consumers of content (i.e. user-generated content), in contrast to Web 1.0 applications. The terms ‘social media’, ‘social network sites’, ‘social software’ or ‘new/participatory media’ also appear in the public discourse to describe Web 2.0 applications.

The different interpretations and terminology used for describing Web 2.0 have created definitional issues, and a number of researchers from various disciplines have described and provided definitions on Web 2.0 technologies. Boyd and Ellison (2007) define social network sites as

web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (p.211).

Selwyn and Grant (2009) acknowledge the expanding scope of these technologies and describe social software as “encompass[ing] all types of Internet applications that support interaction between and within groups” (p.79). Drawing on the latter definition, the phrase ‘social and mobile technologies’ in this thesis is used to cover all applications that allow

users to interact and collaborate with each other mainly via their networked mobile technologies and on the Web.

The thesis employs the term ‘user-generated content’ (UGC) to describe content generated by participants with the use of social and mobile technologies. This content exists mainly online and takes a range of forms, i.e. images, comments, presentations, video. The term ‘visitor-generated content’ is also used to refer to content produced by the participants in the museum.

‘Twitter’

The online social network site employed for the purposes of this research study is Twitter (<http://twitter.com>)¹. Twitter is the most popular microblogging technology that allows its users to create and broadcast content (i.e. ‘tweeting’), usually short messages, links or images of up to 140 characters (i.e. ‘tweets’). The terms ‘micro-posts’ and ‘tweets’ are used interchangeably in the thesis.

Artefact

A term widely used in the thesis is the term ‘artefact’. In this work it represents not only a material thing (‘object’), but also a thing made or manipulated by people for specific purposes and can refer to more than material entities like language, signs, ideas, concepts. More details are also provided in the Section 2.2.2.1 ‘The role of artefacts in museum learning’ and Section 3.1 ‘Mediation by Artefacts’.

¹ Last accessed 1 March 2015
K.Charitonos/2015

1.5 CONTRIBUTIONS OF THE THESIS

This is the first study (to my knowledge) on the use of microblogging before, during and after a school visit to a museum and provides empirical evidence that this technology contributes to young people's visit experience. It highlights practices such as 'live' communication, documentation, sharing, and reflecting, conveyed as important by the young participants that may lead to meaning making. The thesis contributes to a literature which is focused mainly on technological development and content delivery adapted to the needs of users/visitors, with research which focuses on fostering social awareness and reflection *in situ*, by using content generated by learners themselves. It reveals that the use of microblogging reconfigures the museum space and offers opportunities for new ways of engagement with objects within the context of a semi-formal visit. The study follows a pedagogically grounded learning design and adds empirical evidence from young people's use of Twitter in the classroom and the museum, with technological tools shown to support the students to connect their visit experience to the classroom work. This process shapes the types of visit experience that emerge through this learning design: 'focused', 'hybrid' and 'floating' visit. The thesis draws on the notion of 'trajectory' (Dreier, 1999; Rasmussen, 2005), as detailed in Chapter 3, with a study conducted in semi-formal settings. It further draws on the concept of 'trail' (Walker, 2010) to provide evidence that microblogging led students to create online trails that could be re-visited, reviewed and intersect with activities in other learning settings. Evidence suggests that the students were also able to weave everyday informal practices related to Web 2.0 technologies with formal museum visiting practices. The thesis finally makes a distinction between 'microblogging as a tool', 'microblogging as a space to create, review and share content' and 'microblogging as a practice' and points to areas of consideration for designing contexts that are important for technology-enhanced learning.

1.6 SUMMARY

This chapter has provided an introduction to and an outline of the research in the thesis, with an overall aim to examine how a microblogging technology supports museum visit experiences and mediate connections in and across learning settings. An account of the motivation that led to the exploration of this topic was provided, followed by an account of how this work is situated within a broader context. Alongside an account of the problem that the thesis aims to address was provided. This is investigated as a case study and empirical evidence is presented in three chapters (Chapter 5, Chapter 6 and Chapter 7). In the next chapter literature is reviewed that focuses on Web 2.0 technologies in the context of K-12 education (6-18s) and higher education as well as literature on museums, learning and technology.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter reviews research associated with the use of social and mobile technologies for learning in formal, informal and semi-formal settings. These terms were discussed in Chapter 1 (Section 1.4). It covers a range of perspectives to identify some key areas of concern, interest and gaps in knowledge around the applications of such technologies in schools and museums.

In the last decade, technology-enhanced learning has emerged as a significant area of research. The research presented in the thesis contributes to this field by focusing on understanding the contribution of Web 2.0 technologies, such as microblogging, in enhancing students' experience and learning during a museum visit. Ravenscroft et al. (2008) note that the literature examining the use of Web 2.0 technologies across learning settings concentrates mostly on the role of these technologies as a bridge between informal and formal learning. It is indicated that

social media technologies can offer significant potential if they can support informal and formal learning practices within the same digital space through the sharing of common digital literacies.

(Ravenscroft et al., 2012, p.177)

However, there is a need for more empirical evidence to support the argument for integrating social media as effective educational tools (Tess, 2013). My reading of the

literature also points to a lack of qualitative research on the effect of using microblogging platforms, particularly Twitter, as active and informal sites facilitating learning through peer-to-peer social interactions linking with formal classroom education (Kassens-Noor, 2012). An emergence of several studies focused on technology-enhanced learning in the museum context (Vavoula et al., 2009; Pierroux & Smördal, 2010; Walker, 2010) is noted in the literature. Yet, the in-depth examination of a microblogging technology, instead of a technological system designed for research purposes, in activities that enhance learning within an authentic context still remains a neglected area in this research stream. This thesis aims to fill this gap by examining how the use of Twitter contributes to student visit experience and learning (RQ1), and mediates connections between formal and semi-formal learning activities before and after a museum visit (RQ2).

To open this review, Section 2.1.1 and Section 2.1.2 present a review of research related to the potential and specific examples of uses of social and mobile technologies in education respectively. The chapter makes particular references to studies that employed mobile technologies in field trips (Section 2.1.3). It also reviews studies with the use of Twitter, which has emerged as a key microblogging technology in the last few years (Section 2.1.4). Subsequently, in Section 2.2, research focused on museum learning is reviewed, with particular attention to the role of artefacts and social interactions as resources for learning (Section 2.2.2). Research on school trips to museums is also discussed in Section 2.2.3. Following, the review highlights key research gaps in the literature focused on technology-enhanced learning in museums, with emphasis given to mobile technologies (Section 2.2.4). The chapter concludes by summarising the key points and gaps identified in the review of the literature (Section 2.3).

2.1 SOCIAL MEDIA AND LEARNING

2.1.1 The education potential of social media

Social media received increasing attention in the education sector not only because of inexpensive storage, fast search procedures or the high bandwidth of the medium that permits activity with formats such as images, sound and video, but also because of its potential “for radical and transformational shifts in education practice” (Owen et al., 2006, p.4). Contrary to ‘broadcasting’ forms of exchange, Shirky (2003) views the strength of social software in ‘interactivity’, i.e. sharing information and experiences between ‘many-to-many’ rather than transmission from ‘one-to-many’. Interactivity, however, is a property of the technology (Jenkins et al., 2006), whereas the interesting consequences of the participation in Social Network Sites (SNSs) are to do with the emergent patterns of communication practices and knowledge creation. In other words, the Web 2.0 is not simply a technological infrastructure for communication, it is also a set of communication practices: “distinctive human activities that are made possible by this infrastructure” (Crook, 2012b, p.65).

As a result, many studies explore patterns in youth participation, examining on the one hand the pervasive nature of social media in the everyday lives of youth (Ito et al. 2009; Kahne et al., 2010; boyd, 2011; Gasser et al., 2012) and on the other hand, the opportunities learners have to access a range of learning experiences with the use of social media tools (Greenhow & Robelia, 2009; Ito et al., 2009; Junco et al., 2011; Mao, 2014). The primary educational significance of social media appears to be its informal use, thus research associated with this is discussed next.

My reading of the literature on social media facilitating informal learning identified two themes: learner participation in ‘networked publics’ (boyd, 2009), and online identity formation. Ito et al. (2009) used an ethnographic approach across several case studies to document youth practices of engagement with new media and intersections with learning and participation. A distinction provided was between ‘friendship-driven’ and ‘interest-driven’ forms of learning and participation, that allow for transitions between three genres of participation to take place. These are ‘hanging out’, ‘messing around’, and ‘geeking out’. The authors emphasise that it is not sufficient for young people to transfer new media skills or social skills to different domains when transitioning between these genres. Rather, young people should identify with and participate in different social networks in ways that are culturally, socially and situationally specific.

In the same work, Ito et al. (2009) discuss in detail youth participation in ‘networked publics’. Although ‘networked publics’ serve similar functions to other types of publics (e.g. they allow people to gather for social and cultural purposes), the technology structures and shapes people’s engagement with such environments. In her analysis of participation in MySpace, boyd (2009) points to five properties of the networked publics that have implications for informal education. These are: (1) persistence, i.e. unlike speech, electronic text is not ephemeral and can be stored indefinitely; (2) searchability, i.e. search for content, track users; (3) replicability, i.e. with new media duplication and editing/modification of one’s creation is easily enabled; (4) scalability, i.e. communication one-to-many, many-to-many; and (5) (de)locatability, i.e. with mobile phones people are not fixed to a particular point, but at the same time location aware technologies make location important.

boyd calls this a ‘paradox’, meaning that people “are simultaneously more and less connected to physical space” and argues that these five properties have re-configured social dynamics and thus have implications for informal education. These implications include: (1) ‘invisible audiences’, in that no one can tell who is online reading one’s thoughts, while these can be read in a context other than the one intended; (2) ‘collapsed contexts’, since there is difficulty in figuring out what behaviours are appropriated for which context; and (3) ‘blurring of public and private’. Any distinctions of public and private that were made based on fixed location and known audiences are now not possible.

For Jenkins et al. (2006) the main implication from the participation in SNSs is related to an engagement in various learning processes, such as observation, imitation, collaboration and apprenticeship. This participation, importantly, enables the development of cultural competencies and social skills (e.g. performance, appropriation, multitasking, networking, negotiation) that build on the foundation of traditional literacy, research skills, technical skills, and critical analysis (Jenkins et al., 2006). Such competencies allow “communities of users to perform and realise social interaction, self-presentation... and the production, maintenance and furthering of social ties” (Tufekci, 2008, p.547-8). Indeed, a study examining the informal use of MySpace site among teenagers showed that SNSs facilitated emotional support, helped maintain relationships, supported social learning and provided a platform for self-presentation (Greenhow & Robelia, 2009). Importantly, evidence pointed to engagement with an array of communication and creative practices, i.e. creative performance and constructing social networks through multimodal texts.

Crook (2012a) identifies four areas of communication practices—social and cognitive in nature—that are reconfigured due to Web 2.0 technologies and have particular significance

for what might be experienced within teaching and learning. These are: (1) collaboration, (2) publication, (3) literacies and (4) inquiry. For Crook, Web 2.0 technologies are seen as offering tools for convening and managing collaborative activities, which may exist within structures of large scale network participation. They are also seen as providing the tools and an audience for users to create and disseminate original material. In other words, with Web 2.0 technologies, users have access to new modes of representation and expression. Finally, such technologies create new structures for organising data: new sources to refer to, multiple forms of authority, and new tools to interrogate this rich space of information.

Associated with Crook's (2012a) areas of practices are the types of activity evidenced by Luckin et al.'s (2009) study that suggests that learners (11-16s) can be categorised into four main groups (1) researchers, i.e. mainly reading with little evidence of critical enquiry or analytical awareness; (2) collaborators, i.e. mainly in terms of file sharing, gaming and communicating; (3) producers; and (4) publishers, i.e. mainly in terms of sharing experience through social networking sites. The authors highlight the role school may play in supporting and guiding learners towards desirable uses of social software.

Indeed, a key theme often highlighted in the literature is how current institutionalised approaches to formal education may be altered to accommodate such practices and competencies associated with learners' informal uses of Web 2.0 technologies (e.g. see Selwyn & Grant, 2009). Clark et al. (2009) emphasise the importance of understanding the transferability of Web 2.0 skill sets and how these can be used to support formal learning (p. 56). This is especially true when using social media to support learning because of the "perceived difficulties in integrating its emergent fluid forms and meanings into highly structured learning environments" (Lewis et al., 2010, p.4).

Whereas many educational technologists view uses of social media wholly in a beneficial light, others are more cautious and remind us of the need to think carefully about the relationship between technology and learning (e.g. see Selwyn, 2011b). Friesen and Lowe (2011) provide a critical view of social and media technologies as sites of informal learning by suggesting that such technologies might actually prohibit learning rather than promoting it. The researchers point out that in principle and practice these technologies are designed to promote ‘conviviality’ (p.184) and purposefully exclude “fostering the capacity for debate and disagreement” (p.183). Taking this critical view forward, Fitzgerald (2012) argues that even though Web 2.0 technologies provide opportunities for access and content creation, the quality of user-generated content, as well as translating interactions into pedagogically valuable learning can be challenging.

Conclusively, through the review of literature in this section it is indicated that informal uses of social media have potential for learning. Nevertheless, social media sites are services that were not designed for learning (Friesen & Lowe, 2011). It is therefore argued that a careful examination of the properties of the technologies and what people do with them in informal settings can be of value in fostering more engaging and meaningful learning in formal and semi-formal education contexts and enabling mobility across settings.

2.1.2 Social media in formal education settings

Much of the peer-reviewed research exploring the links between social media in formal learning settings is recent and still emerging. To date, studies focusing on higher education (HE) have received the most sustained interest (e.g. see Selwyn, 2009; Madge et al., 2009; Jones et al., 2010; Junco, 2012a). Reasons include student engagement (Heiberger &

Harper, 2008; Junco et al., 2013) and learning outcomes as well as student achievement (Junco et al., 2011; Junco, 2012b). While most studies appear to report positive impact, there was also evidence of drawbacks. For example, Junco (2012a) found that Facebook use (e.g. for playing games) was significantly negatively predictive of engagement scale score but positively predictive of time spent in co-curricular activities. Finally, other work examined affective outcomes. An example is Madge et al.'s (2009) study, which showed that the use of Facebook among first-year students was part of the 'social glue' that helped students settle in university life.

A different perspective in relation to social media in HE was provided in the study by Jones et al. (2010). The researchers demonstrated a distinct divide in students' perceptions regarding technology use in the personal space versus the learning space. Although most of the participants of this study (70%) had an account on a SNSs, they were inclined not to use them for educational purposes. This divide was explained on the basis of: (1) the students tended to separate their social life from their learning; (2) the students were concerned for copyright infringement; and (3) the students were not keen on information overload or the added time constraints that technology may bring. The authors concluded that the learning design is key to address individual preferences for combining or separating the two domains. A preference for an education-related SNS operating exclusively within the institution (e.g. Moodle) to a commercial one was also provided by the participants in a study by Oradini and Saunders (cited in TLRP-TEL, 2012). Similar concerns regarding the use of social media services for academic purposes due to their commercial nature have been expressed by Friesen and Lowe (2011).

Overall, the review of literature indicates that social media technologies have not become a mainstream technology adopted in education. In his review of social media in HE, Tess (2013) concluded that although most universities have the infrastructure and support for social media use, the educators are slow in adopting it for educational purposes.

The role of the educators as they appropriate technological tools according to their own “concerns and ambitions” (Säljö, 2009, p.316) is revealed in K-12 contexts as well.

Research reveals the important role of the teachers, the ways they situate technologies within their classrooms and how their use of the technology impacts on structures and processes in formal education (Littleton, 2010; Mercer et al., 2010; Twiner, 2011; Hillman, 2014). As David Guile puts it, most technology-enhanced gains in learning and achievement “occur primarily because teachers have designed new contexts as well as new learning processes to support learning with [digital technology]” (cited in Reynolds et al., 2003, p.152). This quote highlights teachers’ crucial role in ‘orchestrating’ (Dillenbourg & Jermann, 2010) the learning activities with the use of technologies, with Luckin et al. (2009) arguing that teachers need to ensure that learners not only have the technical skills, but also the metacognitive, synthesis and critical reflection skills to use Web 2.0 applications to support learning wherever they are. That said, one of the most commonly observed barriers to Web 2.0’s integration in teaching is teachers’s lack of knowledge to meaningfully use technologies in instructional purposes (Kale, 2014, p.473).

Apart from teachers’ influence on how technologies are used in their classrooms, students’ perceptions and interpretations of the situations of use in this context also have a key role to play. In a research project undertaken in a secondary school in the UK, Grant (2009) showed that practices that were valued by the students (i.e. written assessment) appeared to

have shaped the use of wikis. This finding indicates that perceptions around practices well established in formal education will distinctively shape the practices that relate to Web 2.0 tools within this context, stressing the importance of “attending to the context of application into which experience with communicative tools and technologies is taken” (Crook, 2012b, p.79).

Indeed, a point that needs careful consideration in introducing Web 2.0 technologies in K-12 education is the tension that might occur between students’ informal uses of such tools, as described in Section 2.1.1, and the rather more formal aims and activities of teachers, e.g. assessment (Crook, 2012b). Ravenscroft (2009), in fact, sees a

clear tension between the tradition of learning as a highly structured and organised experience, involving clear levels of authority, and the more collaborative, volatile and anarchic nature of the social Web. (p.5)

The nature of Web 2.0 might be seen as having “a disruptive influence... and present[ing] specific challenges to existing notions of academic authorship and authority” (Selwyn et al., 2012, p.25), which may not be desirable in the current school culture with rigid practices and behaviours in place. As a result, Littleton (2010) stresses the need to provide teachers with support, time and space to explore the associated implications of technologies for their pedagogy and practice.

Overall, the focus of research around the use of social media and mobile technologies in formal education has been characterised as “the study of how the mobility of learners, augmented by personal and public technology can contribute to the process of gaining new knowledge, skills and experience” (Kukulska-Hulme et al., 2009, p.21). An area that

received much attention is related to the use of mobile technologies to support learning in the field—especially in relation to using properties of the devices (e.g. camera, sensors) to encourage learners to carry out scientific inquiry in the context of discovering and exploring an environment or topic. In this thesis, the intended use of the technologies was to use features of the mobile technologies and Twitter to enrich the context of application (i.e. a museum) by integrating resources generated and shared contextually by the learners. In other words, the technologies were viewed as the means to support *in situ* forms of socially augmented learning. Research associated with field trips and creation of ubiquitous and seamless learning experiences is reviewed in Section 2.1.3.

In his book *Education and Technology*, Selwyn (2011b) reminds us that the evidence for sustained beneficial change related to use of any kind of digital technology is, in fact, limited. He refers to the inconclusive nature of studies examining technology use and associations with ‘impact’ or ‘effect’ in learning. This might stem from the difficulty of objectively measuring ‘learning’ or perhaps misleading views of technology as “an ‘independent variable’ that can be introduced to boost learning and performance levels in the system as it exists” (p.56). As Säljö (2010) puts it, technology will not facilitate or improve learning ‘in a linear sense’ because its significance lies in its impact on

our culture and our communicative/cognitive activities...how we develop skills and exercise intelligent action...Technology contributes to transforming our conceptions of what learning is: our expectations of what people should master, and how human skills should be cultivated.

(Säljö, 2010, p.56)

Overall, K-12 education (6-18s) lags behind in studies investigating Web 2.0 technologies—either as individual tools or as a general category—compared to HE. Reasons might include the role of the teachers—as discussed already—the age of the learners coupled with safety issues (Sharples et al., 2008) or school rules and content filters, firewalls and other technologies to control the quantity and quality of computer hardware and software (Selwyn, 2006).

These reasons, however, do not diminish the efforts to explore Web 2.0 technologies to support education in K-12 settings, as the work presented in this thesis aims to accomplish. This area, importantly, needs research that “offer[s] proof of educational impacts or show how and why such applications fall short of expectations or fail to gain traction” (Rushby, 2012, p.355).

2.1.3 The potential of mobile and ubiquitous learning within and beyond the classroom

Engagement in fieldwork is an important part in the learning process. It provides valuable, practical experiences beyond the classroom that are beneficial for the students, e.g. extend classroom learning and impact on learning interest (e.g. see Hwang & Chang, 2011; Kerawalla et al., 2012). Field trips have been a prominent activity for utilising mobile technologies because it can be demonstrated how people appropriate the technologies in the intended setting (Weilenmann, 2001; Rogers et al., 2005; Kerawalla et al., 2012). The so-called ‘context-aware ubiquitous learning’ (Rogers et al., 2005) supports learning that is ‘situated’, meaning that it involves locating resources and information in context. It also supports ‘social learning’, since it involves social interactions between the learners.

Learning, finally, is seen as ‘authentic’ because it relates to actual people, places and events. In other words, ‘ubiquitous learning’ requires the students to learn in a real-world

situation with support or instructions from a computer system or using a mobile device to access the digital content via wireless communications (Chen & Huang, 2012).

Mobile and ubiquitous learning is based on some blending of the virtual/digital and the physical worlds. In the *Ambient Wood* project (Rogers et al., 2005), where children used mobile devices to explore and learn about the habitats in a physical woodland, digital augmentation was viewed as a promising approach to enhance the learning process, especially by encouraging the dovetailing of exploring and reflecting when indoors and outdoors. Importantly, this project provided evidence of discussion about the wood, which implies that students can make explicit links about what they are experiencing in the field and the digital augmentation they were receiving via the devices. The idea that digital augmentation can make “the invisible visible” and combine “the familiar with the unfamiliar” (Price & Rogers, 2004, p.139-140) was seen as encouraging or enhancing further exploration, discovery and collaboration.

Similar to the *Ambient Wood* project, most research reports design-in support systems for learners by development of special software, e.g. the *Personal Inquiry* (PI) project developed a software toolkit, the nQuire, to support the whole inquiry process and guide learners through their inquiry (Sharples & Scanlon, 2011). Much attention in this field has been also placed in supporting learners in investigating inquiries, defined as “the ability to ask questions (or hypothesise) about the natural and material world, and to plan, carry out and interpret the outcome of activities to answer those questions” (Scanlon et al., 2011, p. 516).

Research shows that mobile devices support inquiry learning by, for example, providing access to resources. Such resources may include user-generated resources, Web resources and ‘apps’ (Rogers et al., 2010; Jones et al., 2013). Mobile devices can also deliver content on-request or ‘serendipitously pinged’ (Rogers et al., 2005). Further to these, learners can utilise features of the devices (e.g. cameras, sensors) to collect and input information while being in the field (e.g. images, sounds) with an aim, for example: (1) to aid identification and share photographs (e.g. see Chen et al., 2003); (2) to reflect on their experience in a different setting from that where it was initially experienced (Rogers et al., 2005); (3) to carry out coursework back in the classroom (Bannan et al., 2010; Sharples et al., 2014); or (4) to contribute content for community activities (Clough, 2009).

Mobile technologies can also connect learners while working on diverse situations and contexts. For example, in the *Out There In Here* project (Coughlan et al., 2011) students working indoors were involved in live interaction and collaborative work with students in the field to ground their understanding. In addition, learners can receive support (Chu et al., 2010) or instructions from systems designed, which can further support communication between learners and with experts. An example is provided by Chen et al. (2004) who describe a training system where the instructors provided feedback to the learners about birdwatching. Systems can further detect behaviours and consequently adapt to the needs of the learners (Chu et al., 2008). Finally, the portability and lightness of the devices, along the ‘mobility of the learner’ (Sharples et al., 2007) support inquiries to be carried out in and across different contexts (Bannan et al., 2010; Jones et al., 2013; Sharples et al., 2014).

While mobile and ubiquitous learning is recognised as having high potential and improving learning performance (Hwang & Chang, 2011), the cost for developing the

dedicated software, coupled with network failures have been identified as issues. The management of the technology itself can be challenging for learners and teachers (Sharples et al., 2014). Time constraints in the field can be restrictive (Meek et al., 2013), while continuous switching of attention between different representations and activities can be distracting (Rogers et al., 2010). Furthermore, despite the excitement or the interest that users might feel when using the mobile devices to learn, the content contributed by them may be of poor quality (Fitzgerald, 2012). In fact, learning in such environments might become too complex and learning achievements could be disappointing (Chu et al., 2010).

To effectively assist the students in interpreting and organising their personal knowledge when using technologies, Hwang et al. (2008) suggest that investigations should be placed in a series of designed lessons that combine both real and virtual learning environments. Other researchers proposed allowing control to the learners over the topics and how to carry out the inquiry investigations (Jones et al., 2013), although it is also stressed (Scanlon et al., 2011) that the learners should be supported in the collection of primary data in the field. Rogers et al. (2010) suggest that the workload associated with the activity of collecting data might restrict students from time for in-field reflection and opportunities for *in situ* learning to occur. Mayes and de Freitas (2004) further indicate that, when designing a situated learning environment, the teacher may adopt a ‘schooling’ perspective to focus on the learning objectives of a curriculum and situating specific content within a context of authentic activities. Fitzgerald (2012), however, highlights the significance of maintaining a delicate balance between ensuring continuous peer-to-peer engagement within a particular domain of activity with the use of mobile technologies and formal learning interventions. As a response to this problematisation, she suggests an authoring framework that can be used as guidance to generate meaningful, high-quality content at its point of

creation. Finally, in Clough's work with a Geocaching community group, which involved no integration of a design-in support system, it was found that the support to the learners came from the community itself, hence it took the form of social support (Clough, 2009; Jones et al., 2013).

The review of literature has shown that much of the research on learning inquiries focuses on natural science inquiries. Consequently, there is a need to study different kinds of inquiries that are relevant in the social sciences. Research also shows that learners use mobile devices as part of a range of resources, rather than in isolation (Kerawalla et al., 2012; Jones et al., 2013). It is argued that more empirical work is needed to examine how learners, when engaged in fieldwork, resource their understandings in the interplay of tools and resources and, in fact, how Web 2.0 technologies contribute to the learning process (RQ2). Finally, it is worth pointing out that the work presented in this thesis does not rely on design-in support system. Instead, it employs a popular microblogging tool (Twitter), embedded in a series of blended lessons in a classroom and beyond. The reason for this choice is the recognition that more research is needed to investigate how features of a Web 2.0 technology and what users do with it (e.g. peer-interaction, creation of content) can provide a mechanism to augment the formal and semi-formal setting and contribute to the visit experience (RQ1).

The museum sector has been at the forefront of research in mobile and ubiquitous learning. A review of research associated with this is provided in Section 2.2.4. In the following section research on Twitter is reviewed.

2.1.4 Emergence of a microblogging technology: Twitter

Twitter was launched in 2006 and since then it has become an increasingly popular microblogging technology. Many scholars believe that microblogging has great potential for promoting learning and so it has gained considerable attention (Ebner, 2009; Ebner et al., 2010). This has resulted in the increasing use of Twitter in classrooms and significant research has focused on its use as an instant feedback tool between teachers and students (Decosta et al., 2010; Kassens-Noor, 2012). Croxall (2010) found that the use of Twitter leads to frequent class discussions, while Wankel (2009) conducted ‘live-tweeting’ experiments and suggests that using Twitter in this way encouraged careful listening, close attention from students and the development of their multitasking skills. Hannay and Fretwell (2011) suggest that Twitter will have implications for the academic workplace as it is expected that students will demand that faculty members communicate digitally, via instant messaging, Twitter and other technologies.

2.1.4.1 Twitter as a learning tool

Grosbeck and Holotescu (2008) expand on the possibilities of using microblogging in educational contexts. Among the possibilities, they view Twitter as a tool for exploring collaborative writing; a tool for assessing opinion, examining consensus, looking for ideas, and a platform for metacognition. Based on research on microblogging in educational settings, this technology appears to hold genuine potential for giving immediate feedback and for documenting processes (Ebner et al., 2010), as well as for making it easy for the audience to ask questions, have discussions and share resources (Ebner, 2009).

Junco et al. (2011) examined the effect of Twitter on college students’ grades and engagement, showing that Twitter can be used to help engage students in the learning

process. They found that the use of Twitter acted as a catalyst in extending class conversations beyond the sessions and provided a platform for students to display openness about feelings and shortcomings. This led to more cross communication and strengthening of existing relationships based on shared values and interests. This highlights the augmenting role of Twitter in building relationships, improving teacher-student communication and creating a comfortable platform for open discussions.

Similarly, Elavsky et al. (2011) investigated the impact of Twitter in a HE lecture course which they suggest is “multi-faceted, unpredictable, but generally positive” (p.15). An important aspect of this work is the mixed-methods approach used in analysing the data, with each method contributing insights into the added value of using Twitter in the classroom. In their review of literature, Gao et al. (2012) critically analysed twenty-one studies published between 2008 and 2011 on microblogging in education. They suggest that microblogging has a potential to encourage participation, engagement, and reflective thinking, as well as collaborative learning under different learning settings.

Some researchers have explored the use of Twitter in informal communication among students within formal-class settings (Aspden & Thorpe, 2009; Richardson, 2009).

Richardson (2009) highlights an example where during a field trip one group of students sent information in real time by tweeting classmates who remained in the class. Building on this, Kassens-Noor (2012) explored the effect of using Twitter beyond the classroom as an active and informal learning tool, focused on peer-to-peer interactions. In this project students were given options to complete their assignments and based on their choice were divided in two groups: (1) the ‘Twitter group’ that used Twitter as their only

communication mechanism and (2) the ‘Traditional group’ that had one in-class discussion and kept individual diaries. The researcher found that

Twitter can foster the combined knowledge creation of a group better than individuals’ diaries and discussion, because Twitter facilitates the sharing of ideas beyond the classroom via an online platform that allows readily available access at random times to continue such discussion. (p.19)

However, Kassens-Noor (2012) also questions the ability of Twitter to facilitate critical thinking and self-reflection because of the character limit. In her studies she suggests that the diary-keeping students showed a stronger display of self-reflection: more students identified their own flaws, whereas Twitter students only identified the faults of others.

The growing research on the role of Twitter in education suggests that Twitter has a role to play as a learning tool. Several studies agree that it can have a positive impact on engagement by facilitating interactions beyond the learner’s social networks. However, this review also reveals that researchers are yet to examine the role of Twitter as an active and informal site facilitating peer-to-peer interaction and enabling connections with formal classroom education (Kassens-Noor, 2012).

2.1.5 Ethical issues around the use of social media

One strand of research on the role of social and mobile technologies in education has a strong focus on concerns about privacy and e-safety, especially with regards to young people. Findings from a study with children of 11–16s looking at their attitudes regarding e-safety and Web 2.0 technologies show that a substantial minority regularly interacts socially online with people they have not met face-to-face (Sharples et al., 2009b). This,

and other activities children (9-16s) do online, are seen as providing them with “risky opportunities” (Livingstone et al., 2011, p.16) that allow for online experimentations with relationships, intimacy and identity. These risky opportunities are linked to vulnerability, as well as resilience, and are related to children’s age, gender and skills. For boyd (2007) teenagers are not necessarily well-prepared to navigate complex social worlds, while Barnes (2006) uses the term ‘privacy paradox’ to describe that teens are not aware of the public nature of the Internet and think of the information they share on social networks as private. As a consequence, parents (Madden et al., 2012) and teachers (Crook et al., 2008) share major concerns about online safety. On the other hand, applying a strict filtering in schools—as already mentioned—could be a barrier to the use of Web 2.0 technologies (Selwyn, 2006). This is reflected in the limited use of Web 2.0 technologies in UK schools as reported by the companion papers from the Becta project *Web 2.0 Technologies in UK Schools* (Crook et al., 2008). They further indicate that adoption of Web 2.0 technologies is experimental and exploratory in line with the findings that many young people predominately use these technologies outside school and for social purposes (Crook et al., 2008; Livingstone et al., 2011).

A number of educational researchers emphasise the need for more systematic education around online safety. For example, Greenhow and Robelia (2009) refer to the concept of ‘digital citizenship’ and stress how important developing awareness of the risks and benefits of new media is for digital citizenship. Similarly, Crook et al. (2008) suggest that schools have a clear role in educating children for safe and responsible engagement with Web 2.0 technologies. In this thesis safety and ethical issues were a main concern throughout the research process, and were appropriately addressed (see Chapter 4).

2.2 MUSEUMS, LEARNING AND TECHNOLOGY

In the following sections the links between museums and learning in the UK context in the past two decades is examined. The implications in the use of technology for educational purposes are discussed.

2.2.1 Contextual Information

Museums operate within an outcome-driven political climate, similar to other cultural institutions that increasingly demand accountability and social value. These demands have positioned cultural institutions high on the political agenda with regards to their instrumental value as tools for social, economic and educational advancement. For example, in the UK the spending review by the Department of Culture, Media and Sports (DCMS, 1998) placed education at the core of museums' work. A year later, the 'National Report for Museum Education' (Anderson, 1999) demonstrated that nearly half of the museums surveyed offered no education services and only one quarter had a professional educator on the staff. As a result, in the years that followed Anderson's report, a range of high profiled initiatives and projects were conducted, e.g. free entry to the National Museums.

A number of publications sought to enhance the museums' commitment to education (e.g. see DCMS 2006; MLA, 2006), provide guidelines to museum staff, and measure the impact of museum-based education (e.g. see RCMG, 2004). In addition to this, a handful of publications sought to highlight the dynamics that new technologies could bring to the sector, e.g. to bridge strategy, to action and to set priority areas (e.g. see NMDC, 1999; Resource, 2001; Loveless, 2002; Hawker, 2004). The prominence of museums as content providers was recognised at a government level and museums became involved in a range

of projects, e.g. Renaissance in the Regions (see Renaissance Review Advisory Group, 2009). A decade later and this view of museums as content providers seems to be still current, as one notes the inclusion of the British Library and the British Museum as partners in FutureLearn (<http://futurelearn.com/>)².

The current landscape has largely changed—the Museums Libraries and Archives Council (MLA) does not exist anymore, while the responsibility for learning and digital provision in museums has passed to the Arts Council England. The museum sector, and particularly regional institutions, face severe cuts in their funding (Quinn, 2012). For museums, recent developments in Web and mobile technologies are viewed as a means to increase visitor numbers and to generate revenue. So far, the use of social media in museums mostly involves one-way communication strategies (Fletcher & Lee, 2012), particularly for marketing purposes (Chung et al., 2014). A number of organisational changes within institutions is noted (e.g. New Media Department at the Imperial War Museum; Tate Media at Tate Gallery). A few museums further developed a digital strategy (e.g. the Smithsonian, National Gallery, Imperial War Museum, Tate Gallery). However, for the majority of the cultural institutions this has been a slow process. At the time of writing this thesis the Museum of London (MoL), which was the setting of the study presented in the thesis, had no digital strategy published. Instead, references to digital developments, viewed as a means to raising museum's profile and engaging wider audiences, are included in the MoL's 'Strategic Objectives 2010-2013' (Museum of London, 2012).

² Last accessed 1 March 2015.
K.Charitonos/2015

2.2.2 Museums and Learning

An edited collection published in 1989 entitled ‘The New Museology’ by Peter Vergo challenges the ‘modernist’ assumptions described in Chapter 1 (see Section 1.4) and marks the departure from the ‘old museology’ which was “too much about the museum methods, and too little about the purposes of the museum” (Vergo, 1989, p.3) to a more theoretical and humanistic museology. This publication, alongside a number of interventions, demonstrates a shift from a fixed and inflexible view of the museum and its contents, towards a more contextual and contingent one (Macdonald, 2011).

The concept of the ‘museum as an authority’ is challenged by a pioneer of museum education, George Hein (1998), who advocates a ‘constructivist museum’. In this perspective, learning in museums is conceptualised as the construction of meaning rather than the acquisition and transfer of information. He specifically refers to the idea that “learners construct knowledge for themselves—each learner individually (and socially) constructs meaning—as he or she learns” (p.89). Meaning, therefore, is made from one’s own experience “through a constant process of remembering and connecting” (Silverman, 1995, p.162), reflecting, linking new ideas and information with old, deconstructing and reconstructing mental structures in order to assimilate and integrate one’s experiences into new ways of understanding, thinking, and acting (Rennie & Johnston, 2004, p.7).

Associated with the idea of a constructivist museum is Hooper-Greenhill’s (2000) concept of a ‘post-museum’. The post-museum is not limited by its own walls and is based on notions of cultural diversity, accessibility, engagement and the use of objects, rather than simply the accumulation and display of objects. For the author the museum

should provide opportunities to visitors to build new knowledge and invite visitors to make meaning through deploying and extending their existing interpretive strategies and repertoires, using their prior knowledge, and their preferred learning styles and testing their hypotheses against those of others, including those of experts.

(Hooper-Greenhill, 2000, p.139-140)

In other words, the post-museum shares ‘poly-vocal’ and ‘multi-channel’ attributes (Parry, 2009) meaning that it engages audiences in ways that recognise the plurality of meanings and the authority of the visitors that enable such meanings to be made. It could be argued that developments in digital and Web technologies have the potential to facilitate this shift in the museum model further. Through the use of such technologies, the post-museum can establish relationships and communications beyond the physical walls of the museum. It may also be engaged in participatory practices of knowledge creation and communication to recognise multiplicity and accommodate diverse voices and changes over time.

In addition to Hein and Hooper-Greenhill, a growing body of research in museums over the last two decades has brought considerable progress in understanding how learning during a visit occurs (e.g. see Falk & Dierking 1992; 2000; Griffin & Symington, 1999; Leinhardt et al., 2002a; Falk & Storksdieck, 2005). Falk (2002), a pioneer in this field, argues for conceptualising a museum experience as an experience that happens “in part” (p. xi) within the physical and temporal boundaries of the museum. Whereas situating our thinking and investigations within an appropriate museum context is necessary, one should acknowledge that the context of the experience (i.e people, objects, meanings)

extends further than the museum itself. A discussion on this is provided in Chapter 3 (Section 3.3).

To summarise, museum learning is a developmental and continuous process (across time and space) and, importantly, each museum experience is unique and has “multiple influences and multiple outcomes” (Leinhardt & Crowley, 1998, p.4). Individuals “construct personal meaning, have genuine choices, encounter challenging tasks, take control over their own learning, collaborate with others, and feel positive about their efforts” (Paris et al., 1998, p.271). This understanding of learning is consistent with a sociocultural view, where social interaction, methods and tools are appropriated when assimilating new ideas and information.

2.2.2.1 The role of artefacts in museum learning

Interacting with and about objects is regarded as key to museum learning. In museums, meaning is constructed from objects and from the sites themselves (Hooper-Greenhill, 1999, p.12). In fact “part of what makes a museum a ‘learning setting’ is the fact that multiple ways of interacting (multiple ways of organising social activity) around and with objects are encouraged” (Rowe, 2002, p.21).

The terms ‘object’ and ‘artefact’ are commonly used in museums, but are both complex concepts. An ‘object’ is usually a concrete, material thing; yet, it also represents a vast continuum of abstract ideas, which are not always represented in a museum context. It may be “a thing, an intention, or a target for feelings or actions” (Hooper-Greenhill, 2000, p. 104) but most importantly, an object is intertwined with interpretations of its meaning and significance. The perceived value of a suffragette’s medal, for example, such as the one

encountered by participants of my study, is highly dependent upon the context in which it exists, as well as its relationship to the viewers. Gurian's (2001) analysis of objects and how they are perceived is indicative of this. On the other hand, the term 'artefact' has a narrower scope—it is a thing made or manipulated by people for specific purposes and can refer to more than material entities, e.g. language, signs, ideas, concepts. Kaptelinin (2011) refers to museum artefacts as “crystallised outcomes, by-products, or tools of activities: be it objects of art, material witnesses of historical events, or simply things from the past” (p. 3). In this thesis both terms are used interchangeably, as discussed in Section 1.4.

Museum objects are generally displayed in multimodal systems, i.e. other objects, audio/visual/textual resources, designed to encourage visitors to consider a particular take on a theme/discipline and facilitate them to make sense of the objects and provide interpretations. Through this process

[visitors] try to find something that we can either recognise or remember, or grasp through analogy. If we can make this preliminary connection, the meaning making process continues. If there is nothing to connect with, we are likely to give up and stop trying. This failure to continue the meaning making process can result in a shallow and rather negative experience...

(Hooper-Greenhill, 1999, p.46)

Interpretation makes visible and “restores the ‘missing’ (hidden) contexts that shape the meaning of the object” (Roberts; quoted in Bain & Ellenbogen, 2002, p.162). Through interpretation, and re-contextualisation, objects and their meanings are continually transformed.

The concept of ‘interpretation’ has emerged in museum literature fairly recently (e.g. see Hooper-Greenhill, 1999) with an origin in media-communication studies and visual culture theory, while on a theoretical level it is related to hermeneutics and constructivist learning theory. Based on these traditions, meaning making is culturally and socially situated and depends on prior knowledge, beliefs and values, as well as on ‘interpretive strategies’ (Hooper-Greenhill, 1999). These cannot be seen as external factors; “they do not exist prior to and independently of a visitor’s activities and experiences in museums. Instead, they are enacted in visitor activities taking place in museums” (Kaptelinin, 2011, p.3). In other words, to make meaning, a visitor draws on some already established systems of knowledge, based on their cultural or social contexts, and on ways they have developed (e.g. observations) and are familiar with, in making objects and situations intelligible. For children and young people in particular, who have not yet developed such systems fully, and whose past experiences in museums are limited, making sense of objects can become a challenging process. Drawing on Hooper-Greenhill’s (1999) quote above, failure to ‘read objects’ may result in a negative experience. What is proposed in this work is that by encouraging and enabling the visibility of interactions or other content generated online in a semi-formal setting, young people may be supported in this process.

Research indicates that individual exhibit elements (e.g. visual stimuli, graphic presentations) appeal to visitors and could evoke learning-talk (Allen, 2002). Children are more attracted to familiar exhibits rather than to novel ones (Sykes; cited in Rennie & McClafferty, 2002, p.195). Encounters with objects are usually brief; Allen (2002) for example refers to the participants of her study having thirty-four stops in exhibits over a period of twenty-five minutes. However, depending on the characteristics of the object, the knowledge and dispositions a visitor brings with him/her and the context in which viewing

takes place, even brief encounters can be seen as stimulating interest, thought and reflection and evoking personal reactions. Museum objects may become ‘an object’ for social interaction and provide “cues for institutional memories of past events... and for personally reconstructed memories” (Paris & Hapgood, 2002, p.44). Paris and Hapgood (2002) also claim that an object allows a visitor to recreate and embrace personal memories, express ownership of the experiences and potentially share their stories with others. Through analysis of visitors’ interactions, Leinhardt and Crowley (2002) argue that an object may serve to elaborate and instantiate familiar concepts, as well as bridge distant and unassociated ideas and therefore support “the transformation of a vague concept into an anchor point for learning” (p.313-314). In the same work, the two researchers suggest four unique features of learning from objects in museums. These are: resolution and density of information, scale, authenticity and value.

Certainly, not all encounters with objects yield a learning experience. In his PhD thesis, Randol (2005) identified some common patterns in visitors’ behaviours in that they simply do what the exhibit affords (e.g. turn a dial) and then observe what happens. He also found that highly developed strategies, such as drawing conclusions and making generalisations, were not frequently observed, while visitors were rarely engaged in discussing differing viewpoints. Even the explanations parents provide to their children tend to be simple, incomplete and mundane (Crowley & Galco, 2001). Associated with this is Allen’s (2002) finding regarding ‘connecting talk’. This involves connections among exhibit elements, previous experiences and personal stories or associations, which are often regarded as key to object-based learning. Such connections were not frequently observed in visitors’ exploration of exhibits at a science museum. In an earlier study, Allen (1997) investigated the effect of different inquiry activities, such as generating an explanation of the

phenomenon or making a prediction, on visitors' understanding of the science underlying an interactive exhibit. Allen found that the interpretation activity was the most effective inquiry strategy in facilitating visitors' understanding of the phenomenon (i.e. shadow-creation). In her investigation interpretation entailed the visitor explaining his/her understanding of this mechanism, based on a label associated with the exhibit (including text and diagram).

Attending to labels or other interpretive resources is a very common practice visitors use to 'read objects' (van Kraayenoord & Paris, 2002). In fact, Allen's (2002) study on visitors' talk in a science museum illustrates that 'attending to labels' largely determined visitors' learning-talk (see Section 2.2.2.2 below for more information on this study). Interpreting objects involves the visitor engaging in a range of practices, i.e. decoding objects, reading the stories of the objects, engaging in the shared reading of the objects (Allen, 2002), which arguably are not straightforward, particularly for younger visitors. Schauble (2002) explains this in an adequate manner:

the qualities that objects have—perceptible, static, enduring, and valuable—tend to make them more visible and salient than the practices involved in making science, art or history. Forms of argumentation, inquiry, and expression are difficult to see and think about. (p.213)

In other words, when looking at an interesting exhibit or object, visitors may have difficulty thinking about the skills they should apply in the process of understanding it.

Supporting the interpretation of objects is cited widely as a prominent area in museum practice, particularly in relation to utilising technologies. For Kaptelinin (2011)

technologies in museums are “of secondary importance” compared to the authentic artefacts and should “become transparent and not distract visitors from interacting with objects” (p.4). He argues that technologies should only support visitors by mediating the activities directed at museum objects. In other words, the use of technologies in museums should help in supporting the re-contextualisation and appropriation of a museum object in a visitor’s own narratives as s/he attends and engages emotionally and cognitively with this object.

In this thesis microblogging is viewed as a tool and a resource that may mediate participants’ activities in ‘reading objects’. Since the use of technology in a museum context is at the core of this thesis, technology-enhanced museum learning is the topic of a more detailed discussion in section 2.2.4. In the following section studies examining social interactions in museums are reviewed.

2.2.2.2 The role of social interaction in museum learning

Museums are spaces that provide a good context for engaging in practices typical of everyday activity, such as conversations. A museum experience is highly social in nature, a feature which seems to directly influence visiting habits (Falk et al., 1998). Indeed, a national survey in the United States provides evidence that museum visits are shared experiences occurring in social groups: sixty-one per cent (61%) of in-person visits to museums are with family and/or other social groups (Griffiths & King, 2008). Most visitors arrive at the museum in a group (family, friends, school) and view the visit as a ‘social event’ in their agenda (Falk et al., 1998). Research in museum learning acknowledges the social character of a visit and has, therefore, embraced sociocultural

perspectives in examining learning (Falk & Dierking, 2000; Leinhardt et al., 2002; Ash, 2003).

A considerable body of work in this area was carried out or influenced by the Museum Learning Collaborative (MLC) (Leinhardt et al., 2002a). Much of MLC's work centres in conversation as a socially mediating activity that is both the "process and product of the museum experience" (Leinhardt & Crowley, 1998, p.5). The introduction of new methods of investigation and analysis is viewed as MLC's key contribution and marked a shift in the museum research, which according to Griffin (2004), afforded a deeper understanding of the nature of learning in these contexts.

Several researchers examined visitor interactions with an aim to find evidence for learning or to identify behaviours/strategies that may promote learning. This research is marked by an attempt to describe visitors' talk, especially by attending to adults' or family visits (e.g. see Crowley & Galco, 2001; Ash, 2002; vom Lehn & Heath, 2007; Gutwill & Allen, 2010). For example, Allen (2002), also mentioned in the earlier section, conducted a study on learning talk by audio recording dyads over the duration of their visit in an exhibition at a science museum. In her analysis she developed five conceptual categories to describe their talk. There are: (1) perceptual talk, i.e. talk drawing attention to, identifying something; (2) conceptual talk, i.e. cognitive interpretations including hypothesis, predictions, reflections; (3) connecting talk, i.e. connections to personal experiences, conceptual connections to other objects; (4) strategic talk, i.e. navigation, how to use exhibits; and (5) affective talk, i.e. expressions of feelings.

In an earlier work in a history and an art museums, Silverman (1999) recorded pairs of adults while viewing a target exhibit. She also identified five basic interpretive acts in the talk of visitor pairs: (1) establishment, which is related to determining what something is; (2) evaluation, which is related to expressing opinion or judgement; (3) absolute object description; (4) relating special knowledge about what is before you; and (5) relating personal experience connected to what is before you.

Silverman's categories correspond closely to Allen's, with a main difference being that Silverman is not addressing 'strategic talk'. Allen further identified 'Conceptual Talk' as a major category of learning-talk. These distinctions might reflect different conversations in the different types of museums represented. Overall, these categories of talk provided a useful 'language' to describe my participants' talk and conduct that is analysed in Chapter 6. However, both studies involved adults engaged in informal learning experiences, while the researchers' focus was to inform exhibition designers.

On the other hand, Ash (2007) examines interactions between parents and their children during their visit to a museum. She analyses their interactions with an aim to identify continuities and discontinuities in their understanding about and appropriation of scientific concepts in their language. Therefore the concept of time was key to Ash's work, similar to the study presented in this thesis. She proposes a formalised tool to trace learners' use of these concepts in their talk, while applications of this tool are also reported in classroom research (Ash et al., 2007). As a result, Ash's method was seen as providing an appropriate frame to examine my participants' interactions during the visit while exploring the galleries in the MoL, especially since the exploration was based on the 'civil rights' concept. Ash's

method of analysis, which influenced the analysis of video data in this thesis, will be analysed in detail in Chapter 4.

Research shows that for family groups, social interaction is a vital aspect of the museum learning experience. Parents seem to influence which exhibits to focus on (Burch & Gammon, 2006), but importantly, in the explanations they provide to their children about an interactive exhibit they are not only “modelling a specific kind of meaning making for their children” (p.411) but notably, scaffolding their children’s transitions from general causal thinkers to early scientific thinkers (Crowley & Galco, 2001). It was also found that parents, peers, teachers and museum educators influence children in forming ideas and conceptual understanding about art (Piscitelli & Weier, 2002). At the core of these analyses are interactions around science exhibits (Crowley & Galco, 2001; Allen, 2002; Ash, 2002), with fewer studies conducted in historic or art collections (Piscitelli & Weier, 2002; vom Lehn & Heath, 2007).

Several studies have investigated scientific inquiry practices with families in a science museum setting (Allen 1997; Randol, 2005; Eberbach & Crowley, 2009). Gutwill and Allen (2009) provide a number of reasons why museums are ideal environments for teaching and learning inquiry skills. Among them is the social character of a visit where groups of visitors draw on each others’ interests and expertise as the group interacts with exhibits. Yet, she also shows that only a few visitors engage in deep inquiry at exhibits for longer than a few minutes. A possible explanation might be the lack of skills required to undertake an inquiry (e.g. questioning, collecting evidence, observing, predicting, analysing, communicating) (Allen 1997; Eberbach & Crowley, 2009).

Whilst research in informal learning in museums has gained considerable momentum in the past twenty years, it is a fact that for some children and young people, school trips are the main means through which they visit museums. This thesis focuses on a formal trip to a museum and emphasises the need to look at the talk and conduct, not only of adults or family groups, but also within school groups. It is argued that this will provide evidence of learning, while use of technologies may contribute to new forms of engagement within the semi-formal setting (RQ1).

2.2.3 Research on school visits to museums

Earlier research (in 1970s-1980s) on assessing learning in museums has been criticised for not fully addressing the complexity of the museum context (Griffin, 2004). Whereas museums provide opportunities for social interaction, as well as choice and control over activities, Griffin (2004) argues that learning during field trips is “hindered by teaching strategies” (p.60) imposed on museums that are more appropriate for formal settings. In the early 2000s, in alignment with developments described in the previous section, there was a shift in museum education research to address students’ views about field trips, their socially negotiated learning behaviours during field trips and the interaction between learning in the classroom and in the museum (see Griffin, 2004).

Recent work on school visits to museums shows that museum education can motivate and excite learners whilst providing them with new insights and experiences (Ramey-Gassert et al. 1994; RCMG, 2004; Wishart & Triggs, 2010). Research suggests that students usually find the visits enjoyable, but, as already mentioned, learning can vary and is unique to each individual (Falk & Dierking, 2000). Learning often becomes more prominent when prolonged with subsequent activities (Falk et al., 2004). For school students, a visit to a

museum can address aspects of their curriculum that might be missing in classroom-based learning. Skills such as selecting, recording and communicating relevant information can be practiced effectively in the museum (Griffin, 1998). As discussed in the two earlier sections, encounters with objects can shape and develop students' conceptual development and attitudes to various topics (Paris & Hapgood, 2002). Depending on the structure of the visit, students are most likely to take advantage of the nature of the settings and pursue personal learning agendas (Braund; cited in Simon et al., 2011). Griffin's work (1998) shows that learning is enabled when students know the purpose of collecting information, if they have some control over what to learn and a feeling of ownership of the way in which they are learning. Griffin (2007) also emphasises the need for students to share their learning with classmates; this is an area where I believe that social and mobile technologies can contribute. Research by Lebeau et al. identified five elements that positively influence students' learning. These are: (1) alignment with curriculum; (2) pre- and post-activity connections; (3) integration with other subjects and disciplines; (4) connection of classroom experience to museum experience; and (5) insistence on student production through problem solving, construction, collaboration, and the use of creativity (cited in Brody et al. 2009, p.8).

Pre-visit preparation "improves the chances of learning especially if it involves integration of the school and museum learning and provides opportunities for student involvement" (Griffin, 2004, p.60). Additionally, preparation can inform students about the practical arrangements for the day (Vavoula et al., 2009) and may familiarise them with space orientation. The importance of post-museum visit activities in the classroom for reflection, scaffolding learning and resolving possible misconceptions is also emphasised by other researchers. For example, Anderson et al. (2000) provide evidence to show that an

integrated series of post-visit activities in their study resulted in students constructing and reconstructing their personal knowledge of science concepts and principles represented in the science museum exhibits. The researchers found that the construction of knowledge was sometimes towards the accepted scientific understanding and sometimes in different and surprising ways. Based on these research findings the present study followed a pre- and post-visit phase of activities, which are subsequently discussed in Chapter 4.

Moreover, similarly to Griffin and Symington (1999) who suggest that looking at how learning takes place can be as informative as determining what learning is taking place, the focus of this thesis is not on ‘measuring’ learning but on examining processes and practices that allow for learning to take place. As discussed in the previous section above (Section 2.2.2.2), research suggests that conversations at museums contribute to, as well as serve as evidence for, learning. However, a few studies investigate interactions within the context of a formal visit in a museum. One example is the study by Piscitelli and Weier (2002), although this involved mixed-age groups. The work presented in this thesis aims to address this gap.

2.2.4. Museums and Technology

The museum sector has been on the forefront of applications of mobile computing (e.g. see Hsi, 2003; Proctor & Burton, 2003; Vavoula et al., 2009; Chen & Huang, 2012; Gray et al., 2012). There is a growing commitment within the sector to deploy technologies as means to augment the museum space or to go beyond the physical limitations of the material artefacts and the space itself. Enriching the visitor participation and enhancing their engagement with, as well as maintaining their appreciation of, the authentic artefacts underpin all these technological developments.

Most of these applications provide additional information about exhibits and displays based on the visitors' location within the museum. For example, Tate Modern launched an interactive audio-visual tour in July 2002 (Proctor & Burton, 2003), which allowed the visitors to view video and still images, listen to curators' commentary and reflect on their experience. Multimedia tours are very popular interpretive resources in museums, and empirical research shows that are positively perceived by visitors (Smith & Tinio, 2008). However, such systems usually provide only one-way information to the visitor, with a pre-defined route guided by the system. To address the lack of choice and interactivity, Hsu and Liao (2011) developed a mobile system that allows the visitor to select interesting exhibits and instantly share a comment about the exhibits through microblogging for other visitors to read. Similar to the study presented in this thesis, Hsu and Liao's system utilises characteristics of Web 2.0, particularly microblogging, that could have a role within a museum setting.

Museum spaces are re-designed to embed computer functionality in exhibition spaces by integrating interactive tabletops that support collaboration and interaction (Pierroux & Smördal, 2010) or developing services and applications that support user-generated content. An example is Tate Tales blog (<http://blog.tate.org.uk/tate-tales/>)³ where children submit stories inspired by art works; or the Family Matters display, where visitor-generated content was showcased in the Tate Gallery. Another example is the Cleveland Museum of Art that has recently introduced an interactive exhibition in which visitors are invited to make facial expressions and poses, which are in turn connected to similar works in the gallery through body and facial recognition software (Alexander et al., 2013). What is more, visitors' own smartphones are employed to capture impressions and reflections and

³ Last accessed 1 March 2015.
K.Charitonos/2015

have become an increasingly integrated part of browsing and social practices in-gallery. Visitors are taking pictures ‘posing’ by artworks (Steier, 2014) and are sharing them on social media sites (Weilenmann et al., 2013a).

Another way to go beyond the limitations of the physical settings is ubiquitous annotation, described as attaching digital information to physical objects and places (Hansen; cited in Winter, 2014). It enables unobtrusive, *in situ* annotation of specific artworks and results in digital content that can be readily re-used and re-mediated. One recent effort to employ ubiquitous annotation in museums, apart from Hsu and Liao’s (2011) system already discussed in this section, is the *QRator* project (Gray et al., 2012). In the context of this project, multiple iPads were used as digital labels. The tablets were installed in the University College London (UCL) Grant Museum to allow visitors—within and beyond the museum—to contribute to discussions and leave comments about individual exhibits. The application provided each exhibit with a QR code that linked the physical exhibit with associated conversations. When a visitor scans these codes, specific information about an object is displayed and allows him/her to join the conversation, resulting in the visitor actively engaged in the creation of their own interpretations of museum collections with the use of iPads and Twitter. The possibility of integrating physical and digital assets is also examined by Petrelli et al. (2013) in a project that aims to bridge the gap between visitors’ experience on-site and on-line by providing a platform for the creation of smart exhibits, i.e. realisations of physical artefacts enriched by digital content.

Such developments signal a growing trend towards blending ‘authoritative’ or institutionally derived sources of information with those from the general public. At the same time concerns about the use of digital and mobile technologies in the museum have

been expressed, including diverting attention of the visitors, hence undermining contemplation and reflection (Hunt, 2004), as well as isolating and inhibiting social interaction (Hsi, 2003; vom Lehn & Heath, 2005). Gammon and Burch (2008) report a mismatch between the content on the device and the visitor's real experience within the museum. Others refer to technologies diminishing the perceived value of the original artefact, i.e. its 'aura' and authenticity or to applications developed as being 'too educative', thus preventing the visitors from having an affective experience (Petrelli et al., 2013, p.60).

In what follows, specific attention is drawn on research focusing on technology-enhanced learning during formal visits to museums.

2.2.4.1 Technology-Enhanced learning in museums

Over the last decade an increasing number of researchers have focused on studying technology-enhanced learning within the museum context. The use of audio, multimedia and wireless tools in museum is not new and Hsi (2003) showed that these tools contribute to inquiry activities in the museum such as exploration, information search, communication, and documenting experience. Some researchers have focused on investigating the use of mobile learning technology in museums with particular audiences, including schools (e.g. see Vavoula et al., 2009; Wishart & Triggs, 2010).

Personal Data Assistant (PDA) devices—currently largely been taken over by smartphones—were used during a school visit to Dulwich Gallery to explore interactive learning experiences. Beazley (2007) suggested that it has led to strong engagement and promoted critical judgements in a self-directed way among the students. However, this research fails

to show a direct link between the use of technology-based activities and their impact on learning within a museum context.

Building on this research, Walker (2010) provides strong evidence that technology helps visitors to make connections with artefacts when combined with other tools and resources. Walker employs a methodology based on visitor-constructed trails which involves identifying and analysing key aspects of visitors' encounters with artefacts during the process of trail construction, as mediated by technological tools, and in contexts. A 'trail' is defined as "a connected sequence of interpretations of individual artefacts or exhibits encountered during navigation of a museum" (Walker, 2010, p.95) and is used as a means to provide one way of linking individual artefacts in a narrative or thematic structure. Walker therefore provides a clear link between the use of mobile technologies within a museum context and their impact on facilitating learning among visitors. Following similar methodology, Reynolds et al. (2010) show that technology has a key role to play in helping to maintain the museum as a learning space, which complements that of universities as well as schools. The researchers developed and evaluated web-based museum trails for university-level design students to access handheld devices in the Victoria and Albert Museum (V&A) in London. The trails were used in multiple ways to explore the museum environment and collections. Students' feedback showed the trails enhanced their knowledge, interest and feelings of closeness to the objects.

Following on Walker's (2010) methodology, this thesis employs the notion of 'trail', as it is anticipated that in a physical space such as a museum and with the use of microblogging and a degree of structure for students' activities, an online trail could be generated.

Walker's (2010) work on visitor-constructed trails provided a conceptual tool that frames

the design of this inquiry. This trail could help the students (and the researcher) to track the exhibits that each group visited and the interpretations associated with these. Additionally, being online meant that others could read the comments and potentially generate further interpretations or reflective comments, in contrast to Walker's study (2010) where audio interpretations were saved on visitors' devices. In this sense, having the young people creating these online trails, especially as it involves an audience, might enable learners to make their own connections with each other and reflect, which are claimed to be "important catalysts to meaning making" (Yang et al., 2010, p.288). In Chapter 6, where the analysis of the visit experience is presented, this concept is discussed further.

2.2.4.2 Technology-enhanced learning within and beyond the museum

A number of mobile applications have been proposed to explore learning before, during and after a visit to a museum (e.g. see Cabrera et al., 2005; Mulholland et al., 2005; Papadimitriou et al., 2007; Vavoula et al., 2009; Kuhn et al., 2012).

Focusing on how to best support the post-visit part of school visits to museums, Mulholland et al. (2005) explore the use of mobile and semantic Web technologies. In their *Bletchley Park Text* project visitors identified items of interest to them by sending SMS text messages containing keywords taken from labels on the exhibits. These messages were later used to select relevant resources, which were organised into a number of views and presented as a personalised website, linking their chosen topics in narrative threads for the visitor to explore further. *Bletchley Park Text* significantly demonstrates that museum visits can act as starting points for long-term learning trajectories, where encounters with artefacts and objects are treated as key points in creating such trajectories.

Similar studies have been developed to explore designs for learning with mobile technologies and social media to support learning in museums and beyond. The *Gidder* project (Pierroux et al., 2011), in particular, made use of wikis across different learning settings to explore the potential of user-generated content to motivate students in the museum and support reflection back in the classroom. This project emphasised the interactions around authentic works of art and other resources (e.g. curator guide) in the museum for developing art historical interpretations. The students worked collaboratively to formulate interpretations of artworks and used their mobile phones to upload and tag pictures, video and sound files, and write text messages. These were sent to a shared blog, which the participants had the opportunity to revisit and edit in the classroom. The blog included tasks and resources by the museum educator, while the end-product was a multimodal summative interpretation of artworks.

Findings from this project suggested that the initial text messages motivated students to edit, expand on and clarify their interpretations from the museum (Crowley et al., 2014). This is an important finding in terms of the work presented in this thesis as it implies that the short format of the tweets would not be restrictive for the students' post-visit activity. Evidence was also provided of the wiki becoming "a knowledge resource and an arena for students' reflections and interpretations that have authentic art encounters as points of departure" (Pierroux et al., 2011, p.34). The *Gidder* project raises an important, but highly neglected issue, which is the role of online communication in relation to the meanings made by the students. However, online communication was seen as mainly contributing to post-visit reflection, while in my work communication on Twitter was also happening in the museum setting. In addition to this, in the *Gidder* project, similar to Walker's work, the technologies were used in the museum as tools to collect information. This marks a

difference with my work, where the use of mobile phones also aimed to foster interactions and social awareness during the visit.

A system designed to support pre-, during- and post-visit learning in the museum and the classroom was *MyArtSpace* project (Vavoula et al., 2009). *MyArtSpace* provided a service on mobile phones and supported children's inquiries during their museum visits. In this project, the teacher set the class an inquiry question, which they then pursued in the museum, working in groups and using mobile phones to gather information (e.g. audio, photo and text notes). This information was automatically sent to a website, where the children could view back in the classroom or at home. Once back at the school, the children developed personal galleries that they presented and shared with their class.

This research project showed that the use of the service was effective in enabling students to gather information in a museum and this provided resources for effective construction and reflection in the classroom. The evaluation process—through interviews, observations and questionnaires—found that the service was more motivating for student learning in the museum than traditional worksheets and demonstrated that the use of mobile devices helps to “bridge” different learning settings (school and museum) by making information captured, generated or accessed in one site, available in another. The study also pointed to students relying on interpretive resources provided by the museum and identified challenges in designing tasks that aided students in producing their own interpretations. Overall, *MyArtSpace* addressed a well-recognised issue, that school museum trips are disconnected from classroom learning. The researchers (Vavoula et al., 2009) also suggested that students needed more structure and guidance to help them make sense of the data they collected, because students would often collect large amounts of information and

struggle to make sense of this information when they returned to the classroom. However, *MyArtSpace* did not examine how a mobile tool could foster social awareness in the museum by providing a platform for students to interact with each other but also to enhance the visibility of these interactions. In my study, microblogging with photographs was seen as adding this element to the museum visit.

An application that is designed to address the issue that students need more structure and guidance across the learning settings is Zydeco (Kuhn et al., 2012). Zydeco examines the use of mobile computing to support students in engaging with science inquiry activities across formal and semi-formal settings. It consists of three components: (1) a website where students set up and access their investigation questions, hypotheses, and data; (2) a data collection/annotation component implemented as an iPhone/iPod app, that allows students to collect data multimodally and reflectively through annotated photographs, audio notes and tags; and (3) an explanation construction component implemented as an iPad app where students view and use the data they and their peers have collected to construct a scientific explanation addressing the questions they are exploring. The system was piloted with middle school students (12-15s) to investigate how the capturing, reflective voice notes, and tagging features of the system influenced student behaviours in the museum, when compared to a traditional worksheet. It was found that Zydeco system encouraged students to engage in significantly more active sociocultural behaviours than the worksheets (i.e. collaborative discussions around how to tag their photographs, share their work). This system, importantly, did not increase the 'heads-down' (Hsi, 2003) behaviour in comparison to worksheets, which is often a concern expressed when technologies are introduced during a museum visit (Cahill et al., 2011).

Overall, the research reviewed in this section highlight the role of image capture with mobile phone cameras or digital cameras in enabling the students to transfer visual information from the context of study to the classroom. Also, the four projects discussed—*Bletchley Park Text*, *Gidder*, *MyArtSpace* and *Zydeco*—highlight the notion of seamless learning, which can be defined as a continuity of the learning experience across contexts (Chan et al., 2006). It specifically refers to

the integrated and synergistic effects of learning in both formal and informal settings, which is distributed across different learning processes (emergent or planned) as well as across different spaces (in or out of class).

(Toh et al., 2013, p.301)

With seamless learning environments on the rise, and due to the distributed and sparse nature of interactions through and over mobile devices, a challenge for researchers and educators is to trace the learning process for understanding students' knowledge advancement (Looi et al., 2013). Drawing insights from the literature, this thesis contributes empirical evidence to show that the use of microblogging can capture instances of seamless learning that is resourced in the sharing and viewing of resources generated by learners *in situ*. It also contributes to the discussion about how to harness promising behaviours and practices within semi-formal settings to encourage more productive meaning making around objects.

2.3 SUMMARY

In this chapter an in-depth review of literature was provided, that drew particular attention to research about social media in education and museum learning. This review pointed that numerous researchers accept Web 2.0 as a space for learners and informal learning rather

than for teachers and the formal provision of learning. The review also emphasised mobile and ubiquitous learning, and discussed studies related to the use of Twitter and the use of mobile technologies in field trips, including museums. Despite the useful insights that existing research provides, the evidence is still limited and social media applications are not widely used in formal educational settings. The review further indicates that there is scope for researching the use of a microblogging tool in a formal visit to museum to examine young people's visit experience, as well as practices among young people that may lead to learning. Further research is required on how such technologies mediate visitors' understanding within and across contexts.

The next chapter describes the theoretical framework that informed the research design and methodology in this thesis. It considers the mediated nature of learning and regards learning in museums as mediated by tools and artefacts, as well as happening over time. It therefore addresses the notion of 'trajectory' employed in this work to emphasise 'time' as a key concept in the learning process. Further to this, learning also happens *in situ* and is best viewed as influenced by physical and sociocultural contexts, hence the Contextual Model of Learning (Falk & Dierking, 2000) that frames this inquiry is also discussed.

CHAPTER 3

THEORETICAL FRAMEWORK

This chapter outlines some key conceptual tools within sociocultural perspectives of learning such as ‘trajectory’, ‘meaning making’ and ‘mediation’. The focus is on discussing how these concepts shape this work and help answer questions raised by my data. In this work, learning is considered as a ‘social practice’. Therefore, I adopt a focus on learning as an interpretive act of meaning making, a process rather than an outcome and a joint activity of a group rather than being attributed exclusively to the individual. Meaning is also viewed as being articulated in a range of resources. I foreground the significance of orchestrating meaning through selection and configuration of sets of resources, which are culturally and socially shaped over time.

The chapter starts with a consideration of the mediated nature of knowledge (Section 3.1). Section 3.2 addresses the notion of ‘trajectory’ by tracing back some of the most significant contributions to this concept. The Contextual Model of Learning, proposed by Falk and Dierking (2000), is discussed in the section that follows (Section 3.3) and its strengths and limitations with regards to this work will be analysed. The Contextual Model is treated primarily as a theoretical perspective on meaning making, which is specific to museums.

3.1 MEDIATION BY ARTEFACTS

Within the sociocultural perspective of learning, knowledge is seen as being mediated through the use of ‘tools’ or ‘artefacts’. For Vygotsky (1986) human activity, e.g. thinking, feeling and communicating, is highly dependent on cultural practices and interactions with others and tools, where tools can either be ‘technical’ or ‘cultural’ tools. The idea of tools mediating human action was central to Vygotsky and his claims were played out primarily in connection to language. Language was seen as providing the means for both coordinating action and thinking together. Wertsch (1994) stresses that basic to Vygotsky’s orientation was the understanding that mediational means do not only facilitate forms of action that would otherwise have occurred. Instead, “by being included in the process of behavior, the psychological tool alters the entire flow and structure of mental functions...” (Vygotsky; quoted in Wertsch, 1994, p.204).

Learning and the development of understanding are, therefore, shaped by the specific uses of such tools, which are considered to be “the products of sociocultural evolution and are appropriated by groups or individuals as they carry out mental functioning” (Wertsch & Tulviste, 1992, p.552). In other words, whereas all humans share a capacity to use language in a variety of ways, Vygotsky’s assumption was that “only more advanced groups had taken the evolutionary step necessary to use words in abstract, decontextualised ways” (Wertsch & Tulviste, 1992, p.552), i.e. ‘everyday’ versus ‘scientific’ concepts.

Although directly influenced by Vygotsky’s work, other researchers moved away from this evolutionist account of conceptual development. They argued that key to understanding humans’ mental processes lies in the activity settings in which humans are required to function (Wertsch, 1991). Tools are essentially a part of the ‘cultural tool kit’ (Wertsch

1991) available in a particular sociocultural setting. It is through engagement in socioculturally situated goal-oriented activities that tools are given meaning. Wells (1999) expresses this succinctly:

in these particular, situated events, both activities and artefacts are transformed, as, are our own resources for thinking and doing, as, acting together, we adapt, extend, and modify both intellectual and material resources in order to solve the problems encountered.

(in Wells, 2001, p.6)

In this thesis, emphasis is given to spoken and written discourse, which is also perceived as a mediating artefact (Wells, 2002, p.43). The online posts are viewed as mediating artefacts for the groups of students across time and space. In addition they are a product of specific social contexts. They are viewed as material representations of meanings (Kress, 2010, p.27) made by the students during the visit and are accessible to the researcher through the specific medium (i.e. Twitter). These meanings are multimodally realised, in that they are constituted by a number of modes of representation (i.e. text and images).

In this work I foreground the significance in identifying, selecting and appropriating resources to mediate the students' learning activities in content generated by students themselves rather than always being directed by the resources that institutions or teachers provide. The focus of this thesis is on the analysis of the online discourse to identify whether it contributes to the visit experience by enabling meanings to be made (RQ1), and to examine the role of the discourse as part of the resources available for developing understanding in and across contexts (RQ2).

3.2 TRAJECTORIES OF MEANING MAKING

Time is a key issue in learning; most learning does not happen suddenly. Rather, the development of understanding and construction of knowledge evolves over time. Current learning depends on previous learning, while it also forms the basis for building further learning at a later time. As Barnes observes “We do not one moment fail to understand something and then the next moment grasp it entirely” (quoted in Mercer 2008, p.34). Similarly, Rennie and Johnston (2004) claim that “learning is change and change is not instant” (p.7). Indeed, the way we communicate past or future events, organise activities or use tools and artefacts is shaped by the concept of time.

The temporal dimension of learning has been recognised and examined by several researchers, especially in a classroom environment (Rasmussen, 2005; Mercer, 2008; Littleton & Kerawalla, 2012). However, there are only a few studies investigating the significance of museum visits over time (e.g. Falk & Dierking, 1997; Ellenbogen, 2002). It has been argued that the impact of museum visits may not be apparent. For Rennie and Johnston (2004), for example, “time is required to allow learning to find relevance and be transferred from the context of the museum to other contexts in the visitor’s life situations” (p.8). In this thesis, I argue that more attention should be given to the temporal dimension of museum learning, if we are to realise how visitors make meaning from their museum experience. Therefore, in what follows, the concept of time with particular reference to its potential for understanding museum learning in and through trajectories of meaning-making is discussed. In my work I use ‘trajectory’ as a concept that enables me to study how students’ development of understanding unfolds chronologically along different timescales.

Mercer (2008) refers to ‘trajectory’ as a concept that could help the teacher to track the learners’ experience as a series of events, and note continuities or discontinuities for those who are involved in this. Episodes that seem distant in time and space may still be relevant in the learning process, so a key task for an analyst, according to Ludvigsen et al. (2011), is to ask in what ways a current event is linked to a past event and to future events. Building on this, this thesis examines how connections are made between events, settings and ideas over time and how this process is mediated by the use of microblogging (RQ2).

Dreier (1999) examined the concept of trajectory and draws on the idea of learning as situated in a particular practice and expands on the idea of people as “participants in social structures of practice” (p.6). He introduces the concept of learning trajectories to draw attention on how an individual moves from one context to another—home, school and workplace. In other words, Dreier (2003) focuses on how a person conducts his or her life in a trajectory of participation, in and across social contexts in a way that depends on their varying personal scope, influence, and co-participants. He stresses that not only is learning situated in a particular practice, but also that participation in one practice cannot be comprehended in isolation from other practices that a person traverses. Furthermore, he highlights that “we cease to study learning as isolated acts of learning and instead locate these acts of learning in more or less complex and far-reaching trajectories of learning” (2003, p.25).

Drawing on Dreier’s concept of participation trajectory, Rasmussen’s (2005) PhD thesis focuses on project work in a classroom setting. She highlights the pattern of children’s involvement in a particular, extended classroom activity from its inception to its conclusion some weeks later. She describes the development of participation trajectories,

in terms of exploring how the domain is introduced by the teacher, and the ways in which the student interprets, alters, resists and accepts, concepts that arise during teaching and classroom discussions. Drawing on Rasmussen's (2005) work, the concept of trajectory in this thesis has been used as a theoretical, methodological and analytical tool: theoretically, the concept implies that the construction of knowledge and meaning is considered as an aspect of participation in social practices; methodologically, the concept implies organising the data and the thesis chronologically; and analytically, it implies studying the unfolding of the activities and how participants construct knowledge and meanings both as a moment-to-moment achievement and over time.

Mercer (2008) states that

to understand how classroom education succeeds and fails as a process for developing students' knowledge and understanding, we... need to understand the temporal relationship between the organisation of teaching and learning as a series of lessons and activities... (p.35)

In other words, for Mercer (2008)

the process of teaching and learning in school has a natural long-term trajectory and cannot be understood only as a series of discrete educational events. (p.33)

Mercer though, differs from Dreier (1999; 2003) or Rasmussen (2005), in that he does not refer to a participation trajectory. Rather, he talks about a 'dialogic trajectory' and he is concerned with speakers moving together through a series of related interactions within school settings. In this thesis I refer to trajectories of meaning-making, drawing on Baldry and Thibault's (2006) work on analysing Web pages. The two researchers examine how the

semiotic and technological resources of a Website (e.g. hyperlinks) afford users creating and negotiating the meanings along a particular meaning-making trajectory. I also draw on Twiner (2011) who examines trajectories of meaning making as they emerge and are negotiated through classroom interaction. Twiner is particularly attentive to the teacher's intended meaning making trajectory in the context of the meaning making trajectories that were instantiated by the pupils as the lessons unfolded over time. In my work, though, the concept of 'trajectory' is contextualised within the dynamic environment of a formal and semi-formal learning setting. Attention is drawn on facets of a semi-formal visit to explore how resources available (e.g. microblogging, tweets, mobile technologies) are employed to support extending such experience beyond the visit (RQ2). Attention is also given to practices to examine how they are interwoven within and across the settings, and how they influence the emergence of the trajectories. A distinctive approach is, therefore, offered by considering trajectories of meaning making as they emerge across contexts.

Such trajectories

are full of interruptions; they are discontinuous. They involve finding ways to get back to them and pick them up again at other times and places and in ways agreed upon by other involved co-participants. If not, a learning trajectory may get lost altogether or the internal continuity of its pursuit may be weakened. Indeed, sometimes a learning trajectory is only remembered and picked up again because present occurrences make us draw a link to it anew

(Dreier, 2003, p.26)

This is valid about learning in museums too. If a museum visit is considered as a node (i.e. central point) in a learning trajectory, the meanings that one makes during a museum visit

may never become apparent unless current circumstances in one's life allow for this person to draw back to this node. Hence, how a learning trajectory is developed and becomes relevant for a person "is constituted in social action" (Silseth, 2012, p.66). A key issue for people involved in education then, is to resource and support processes that will help learners develop their meaning making trajectories while moving across sites, tools and practices.

Ludvigsen et al. (2011) put forward the idea that when people learn in different practices, they follow different learning trajectories, but these trajectories can also intersect in specific ways. They argue that

learning occurs when different timescales meet and intersect, and meaning-potential becomes transformed to common objects (physical and discursive).

(p.110)

For instance, when learning about 'civil rights' in a history class, as in the research design of this thesis (see Section 4.3.1), a trajectory involving personal experience relevant to this concept can intersect with historic knowledge in different ways. Also learners' uses of the technologies, along 'possibilities of action' (Barab & Roth, 2006) afforded by the tools, the settings and the learners' intentions, practices and experiences provide the basis for learning to take place.

However, the introduction and use of technologies may change social practices in unpredictable ways and may also create tensions in current practices. For Ludvigsen et al. (2011) the "re-ordering and emergence of new knowledge and competence are key in the creation of new stabilities in practices with the use of new technologies" (p.106). Such

tensions, new knowledge and competencies need to be thoroughly examined. Hence, several empirical studies seek to investigate the introduction of new technologies in different settings and practices. A number of studies employ the concept of trajectories in such investigations, but it is noted that this notion has become widely circulated in many fields and it is used quite differently, depending on each tradition (e.g. see Benford, 2009).

Relevant to this thesis are, for example, studies conducted by researchers at the University of Oslo. Steier and Pierroux (2011) investigated the development of conceptual understanding among secondary school students as a trajectory that spans physical and institutional boundaries. Their study contributes to understandings of the multilevel interplay between resources and settings that may be made relevant to meaning making. Pierroux and Smödräl (2010) employ the concept of trajectories to investigate group interactions using a multitouch table, where the overall aim was to integrate this work into a trajectory of whole class learning activities that span across a two-day workshop. In the UK context, Littleton and Kerawalla (2012) refer to ‘trajectories of inquiry learning’, focusing specifically on the challenges educators confront in ensuring that young people have a coherent, cumulative experience of the diverse activities, ideas and settings that are implicated in the process of inquiry learning. Their work was based on data collected in the *Personal Inquiry* (PI) project. Overall, it captures ways in which a teacher may assist in the interweaving of activities, ideas and resources and in this way help students to realise that their work has cumulative characteristics and is a part of a greater whole. Although this thesis neither focuses on teachers’ perspectives nor inquiry learning, what is important to draw on from Littleton and Kerawalla's (2012) study is that they highlight the role technologies play in mediating the processes of connection building across phases of activity during the project work.

In sum, the concept of trajectory provides a unit of analysis and levels of description that make meanings across sites more transparent. It enables me to understand and conceptualise the changes in learning. Therefore, in the chapters that follow I will use this perspective and the associated concepts to interpret and discuss my research and to examine how the use of microblogging mediates connections across temporal and spatial contexts (RQ2).

3.3 THE CONTEXTUAL MODEL OF LEARNING

Falk and Dierking initially put forward the Interactive Experience Model (1992), and a decade later, a refined version known as the Contextual Model of Learning (2000). This model draws on constructivist, cognitive and sociocultural theories and its key feature is the emphasis it places on context.

The Contextual Model of Learning aims to frame meaning making occurring in a museum context rather than making predictions, since it recognises that meaning making is always a complex phenomenon. It posits that “all learning is situated within a series of contexts” (Falk & Dierking, 2000, p.10). It identifies three overlapping contexts: the personal, the physical and the sociocultural, none of which is ever stable or permanent. Falk and Storksdieck (2005) acknowledge that these contexts are all changing across the lifetime of the individual. In other words, this model views learning as a continuous interaction between the individual and his/her physical and sociocultural contexts over time. Importantly, it conceptualises learning as both a product and a process between the three contexts. It also views the visitor as being actively engaged in the construction and reconstruction of these three contexts, a process which is shaped by ‘time’ and the three contexts. The most recent version of this model is depicted in Fig. 3.1 (Falk & Dierking,

2008). Taking into account findings from previous research, Falk and Dierking (2008) propose twelve “suites of factors” (p.24) that influence museum meaning making. In the following paragraphs these twelve factors will be discussed in more detail. The factors are outlined in Table 3.1.

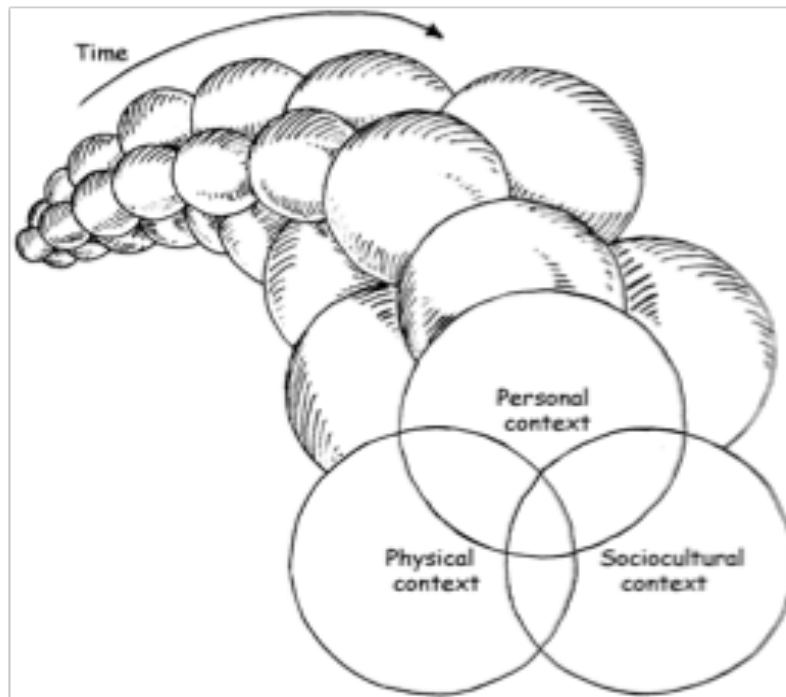


Figure 3.1 The Contextual Model of Learning (Falk & Dierking, 2008)

The personal context takes into account what visitors take with them in the museum. In other words it “represents the sum total of personal and genetic history that an individual carries with him/her into a meaning making situation” (Falk & Dierking, 2008, p.21). Therefore, from the personal context perspective, one should expect meaning making to mirror an individual’s motivation and expectations; to be strongly influenced by an individual’s past knowledge, experiences, interests and beliefs; and to be the outcome of an individual exerting both choice and control over his/her own experiences. The personal context and its associated four factors, highlight the constructive and cumulative nature of

a visit experience, since the focus is on the contribution (if any) a new visit experience makes to the previous understandings.

The sociocultural context recognises that meaning making is socially and culturally conditioned. Further to this, one should expect meaning making to be strongly influenced by the interactions and collaborations an individual has with his/her own immediate social group; and to be strongly influenced by the quality of interactions with others outside the individual's own social group, i.e. staff, other visitor groups (Falk & Dierking, 2000). Artefact mediation is not identified as a factor in the sociocultural context, rather is associated with the physical context.

Table 3.1 Twelve suites of factors influencing museum learning (Falk & Dierking, 2000)

Context	Factors
Personal Context	<ul style="list-style-type: none"> • Motivation and expectations • Prior knowledge and experience • Prior interest and beliefs • Choice and Control
Sociocultural Context	<ul style="list-style-type: none"> • Within group social mediation • Facilitated mediation by others • Cultural background and upbringing
Physical Context	<ul style="list-style-type: none"> • Advance organisers • Orientation to the physical space • Architecture and large-scale environments • Design of exhibits and content of labels • Subsequent reinforcing events and experience outside the museum

Finally, for Falk and Dierking (2008) meaning making is “always a dialogue with the physical environment” (p.22). Therefore, from a physical context perspective one should expect meaning making to reflect an individual's reaction to the physical environment of the museum itself (e.g. space, lighting, objects) and its affordances (Falk & Dierking, 2000). As such, a visitor's meaning making will be strongly influenced by navigation and

orientation in the space and facilitated by advance organisers. Further, meaning making is influenced by exhibition design features (e.g. sequence, position, content, labels). This perspective also recognises that meaning making relies on experiences one may have post-visit, similarly to enriching previously known constructs (Falk & Storksdieck, 2005). This is because the Contextual Model acknowledges the cumulative character of learning.

In a study reported by Falk and Storksdieck (2005) evidence is provided to suggest that none of the factors alone emerged as the variable that could explain much of the learning observed and measured. Their study, based on a repeated measure design that included pre/post interviews and observational and behavioural measures obtained through tracking of all participants throughout the duration of their visit to a science centre, suggests that suites of factors rather than individual factors, are significant in affecting visitors' learning. This is also museum specific (e.g. art museums and natural history museum collections differ) and varies depending on the individual (Falk & Dierking, 2008). Yet, Falk and Dierking (2008) attribute more importance to the personal context rather than the other two in terms of predicting learning outcomes.

Overall, what is important for this thesis is that the model provides “an overall conceptual map of issues related to understanding museum experience” (Kaptelinin, 2008, p.2) and an acknowledgment that meaning making is not exclusively an in-museum experience. Apart from that, this model reinforces the idea that meaning making is complex and influenced by a range of factors. No single factor individually can provide a reasonable justification about meaning making outcomes (e.g. in visitors' understanding, attitudes or beliefs). This model also helps to frame a discussion about meanings made by individuals in a visit and it stresses that in order to frame such a discussion, an understanding about visitors across

different timescales is required: (1) pre-museum visit, e.g. expectations, prior knowledge; (2) during museum visit, e.g. group interactions, physical environment, advance organisers; and (3) post-museum visit, e.g. post-visit conversations. This aspect was addressed in the research design and will be presented in Chapter 4. Yet, it is noted that these time periods intertwine with each other, meaning that what visitors ‘bring with them’ to the visit not only influence meanings made during a visit but they also seem to form the criteria by which visitors judge their visit experience (Falk & Storksdieck, 2009).

The Contextual Model also raises awareness that much of the meanings made in and from museums do not necessarily ‘add new knowledge’. Rather, research suggests that museum experience reinforces previous understandings (cited in Falk & Dierking, 2008, p.26). The Contextual Model, further, seems to provide insights into ways digital technologies could potentially influence visitors’ meaning making by “extending the experience beyond the temporal and physical boundaries of the museum visit” (Falk & Dierking, 2008, p.28).

Technologies could assist the visitors in customising their experiences and meeting their own interests and needs, as well as to help them in making connections among all three contexts. The two researchers suggest that technologies will enhance one’s meaning making if their use meets the personal and social needs of the visitors. Specifically, they argue that technologies

must build on and optimise visitor’s prior experiences and knowledge, connect to their social group, and directly support visitor’s motivations for visiting and their interests before, during, and after the experience.

(Falk & Dierking, 2008, p.28)

In this work, the use of mobile technologies during a visit was viewed as having the potential to advance connections within social groups, and foster social interactions and awareness among visitors.

In the following section the limitations of this model in relation to the thesis' investigation are discussed.

3.3.1 Limitations of the Contextual Model of Learning

Falk and Dierking (2000) refer to museums as informal, 'free-choice' learning environments and have developed the Contextual Model based on this understanding of the nature of a visit. Adult or family museum visits are typically brief, driven by interests and issues of personal relevance to the visitors, moderately structured (or not), and unlike formal learning, not framed by a set of goals imposed by teachers or a school's curriculum. Another characteristic of all free-choice learning experiences is the degree of choice and control over what the visitors actually attend to. Inevitably, one may argue that a school visit cannot be considered as a 'free-choice' visit. Whereas this might appear as a limitation in the use of this model in this work, I also view the Contextual Model as providing a framework around the suites of factors affecting learning outcomes, which can be utilised in designing formal school trips in museums.

The Contextual Model of Learning places particular emphasis on context. In the initial model proposed in 1992 the museum experience was conceptualised as "a series of snapshots, each freezing in time a moment of interaction of the three contextual components" (Falk & Dierking, 1992, p.6), viewing in this way the three contexts as "overlapping and distinctly analysable" (Rennie & Johnston, 2004, p.7). The Contextual

Model received some criticism on the basis of this conceptualisation, with Rennie and Johnston (2004) arguing that this view directs attention away from the "realisation that things don't just happen in a context; the context is part of what's happening" (p.7). This is reminiscent of Cole's distinction between context as 'that which surrounds us' and context as 'that which weaves together' and Nardi's statement that "context is not an outer container or shell inside of which people behave in certain ways... context is not just 'out there'" (quoted in Sharples, 2010, p.4).

Therefore, unlike Falk and Dierking (2000) who propose that meaning making only occurs in a series of contexts, Sharples et al. (2007) stress that making meaning also creates contexts through continual interaction. In fact, context should be viewed "as an artefact that is continually created by people in interaction with other people, with their surroundings and with everyday tools" (Sharples et al. 2009b, p.4). As such, the context is never static—it is in flux and meaning making flows across locations, time, topics and technologies.

The depiction of the Contextual Model (Fig. 3.1) shows all three contextual spheres moving together through time. Walker (2010) claims that the image is 'vague' and the use of spheres on the image presumably depicts instances, when the three contexts might or might not overlap (p.73). In this thesis, rather than identifying the characteristics of three distinct contexts as proposed by Falk and Dierking (2000) and analysing their significance for meaning making for specific students, the focus of analysis becomes the interaction around artefacts and the tools and resources utilised.

The last point in this section examines whether the Contextual Model is adequately suited to the design and analysis of uses of digital technologies in a museum. Kaptelinin (2008) views this with scepticism and argues that the Contextual Model “needs to be further elaborated and combined with other concepts and research strategies that would ensure a more detailed understanding of the micro-dynamics of visitor’s interactions in museums” (p.2). This model, he argues, due to its focus on large-scale contexts and despite depicting the complexity of museum meaning making, does not fully address the needs for conceptual support for the design and implementation of digital technologies in museums. In line with Kaptelinin is Walker (2010), who also argues that the Contextual Model does not explicitly provide any account for the concept of mediation, either by technological tools, interpretive materials, curators or other individuals (p.73). Physical context includes all tools and artefacts, while other people or social groups are included in the sociocultural context.

Clearly, the recent advances in digital and web developments blur the boundaries between the contexts set by this model. Physical context variables are important, but in line with Falk and Dierking (2008) “equally if not important are a visitor’s personal and sociocultural contexts” (p.28). What this model does succinctly is to provide a frame within which to situate one’s visit experience, and to remind us that any advancements in the technological tools aiming to enhance museum learning can be successful to the extent they fulfil the personal and social needs of the visitors.

3.4. SUMMARY

Chapter 3 considered the mediated nature of knowledge and drew on the concept of ‘trajectory’ to show that this thesis attends to the temporal dimension of the meanings made, in and across contexts. The next chapter shows how, by drawing on sociocultural

perspectives of learning, a research design was developed that allowed me to effectively carry out this investigation. In this thesis' inquiry, learning is viewed as mediated by tools and artefacts and influenced by sociocultural and personal contexts. Therefore, as shown in Chapter 3, this work is situated theoretically within the Contextual Model for Learning to acknowledge the range of factors that influence learning in museums. The thesis examines the use of a microblogging technology and how it contributes to one's visit experience (RQ1), as well as how it mediates connections in and across settings (RQ2), particularly in relation to opportunities for interaction, content creation, and meaning making practices. Therefore, the next chapter discusses the research design and the analytic approach taken (see Section 4.5.1) to work with specific methods and address these questions.

CHAPTER 4

RESEARCH METHODOLOGY

Chapter 4 introduces the research methodology used in this research and considers some of the methodological issues that relate to the study of learning in museums. It focuses on the research design and implementation. Particularly, the focus is on the students' activity across the settings and the analysis of this activity as a process, which involves use of various tools and artefacts across formal and semi-formal settings. This chapter documents how I employed a combination of data collection methods and analysis within a case study method, and drew on sociocultural perspectives of learning to provide understandings and effectively investigate and answer the research questions. The two questions formulated after reviewing the literature in Chapter 2, were as follows:

- RQ 1: How does the use of microblogging with photographs contribute to the students' experience during a museum visit?
- RQ2: How does the use of microblogging with photographs mediate the students' connections between classroom and museum activities, both before and after a museum visit?

The first part of this chapter outlines the methods used to collect data for the main study. First the case study methodology is reviewed (Section 4.1.1). This is followed by a discussion on methodological issues around conducting research and designing

educational interventions in a museum (Section 4.1.2) and in a classroom (Section 4.1.3). Section 4.2 outlines the pilot study and highlights the main findings that informed the design of the main study, which is also described in Section 4.3. Section 4.4 discusses the choices made regarding the methods used for answering the RQs and demonstrates how these methods build on previous research. The second part of this chapter (Section 4.5) involves a detailed account of the methods employed to collect and analyse data. This part also provides an account of the process followed in order to adhere to the institutional requirements of conducting research with human participants (Section 4.6). The chapter concludes by summarising the key points identified in the discussion of the research design and methodological strategy (Section 4.7).

4.1 RESEARCH DESIGN, PROCESS AND METHODOLOGICAL STRATEGY

The main aim of this thesis is to explore how the use of a specific technology in a semi-formal setting contributes to students' visit experience (RQ1). The research context and questions influence the methodological strategy adopted. It builds on the methodologies used in studies which investigated the use of mobile technologies in fieldwork, including trips to museums (see Section 2.1.3 and Section 2.2.4). Building on these studies, and based on the RQs, a case study research methodology is identified as an ideal research strategy for this research. This section explains in detail the rationale of choosing this methodology.

4.1.1 The case study research methodology

A case study method is considered to capture the complexity of a few cases or just a single case, supporting the researcher in gaining an in-depth understanding of a situation. The primary advantage of a case study is that it enables a much more detailed

investigation of a phenomenon under consideration as compared to other methods (e.g. surveys). Stake (1995) refers to this method as “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (p.xi). Further, Yin (1994) defines a case study as an empirical inquiry that investigates “a contemporary phenomenon within its real-life context” (p.23), especially when the boundaries between phenomenon and context are not evident clearly. This definition highlights both ‘real-life’ and the ‘context’ within which a phenomenon is generated, as key elements in the investigation of an issue of interest. Additionally, a case study investigation makes use of multiple sources of evidence (Yin, 1994). As a result, Merriam (1998) argues that dealing with a full variety of evidence is a unique strength of a case study approach.

In this thesis, a qualitative mode of inquiry into a single case is presented, where episodes of “real people in real situations” (Cohen et al., 2009, p.181) are highlighted, i.e. students being in the classroom and the museum. In this work a rigorous interpretation of the events is presented. The analysis and interpretation of the data collected offer a version of the events based on the perspective I adopt in this inquiry and the ‘reality’ I construct given my involvement in the case. However, in conducting and writing this case study, steps to ensure validity and reliability were taken by using multiple sources of evidence and adopting a systematic way of collecting this evidence.

In this inquiry I consider a school visit to a museum, involving a series of activities with the use of microblogging across the classroom and the museum as the object of my case. In this sense, this research is focused on learning processes as a response to technologies used and therefore, a research strategy should allow all contextual

elements (e.g. prior knowledge, design of activities, teaching, specifics of technologies, interactions) to enter into analysis. To capture the interaction between the phenomenon and its context, a case study methodology is regarded as an appropriate research methodology for this particular investigation. This thesis also focuses on students and their activities in both the classroom and the museum, where control of variables is arguably limited. This provided another reason for which the case study method is seen as appropriate for this inquiry.

A single case study with an embedded design was preferred, where different, ‘embedded’ units are studied within a single case (Yin, 1994). The embedded units are: online discourse, objects, technologies, time, groups of students and individuals (see Fig. 4.1). Opting for one case study allowed me to use a variety of evidence and units of analysis to offer a comprehensive interpretation of the use of Twitter within this context, rather than to spread my analysis across many cases. This study, even though it cannot establish the frequency or prevalence of a phenomenon, can reveal the mechanisms by which it is brought to being emerging, sustained, changed or in transition.

One issue that needs to be addressed here is the type of case study I conducted. This study is not looking for causal relations and therefore, does not aim to explain whether any events occurred reflect a cause and effect relationship. Rather, this study can be characterised as both descriptive and interpretive, on the basis of Merriam’s (1998) classification. It is descriptive in that it provides rich descriptions of the phenomenon within its context. It also has interpretive features, since I aim to develop conceptual categories inductively to examine initial assumptions. Yet, and according to Yin’s (1994) classification of case studies in terms of outcomes, I also consider that this study

has exploratory characteristics, because it can be used as a preliminary to subsequent studies.

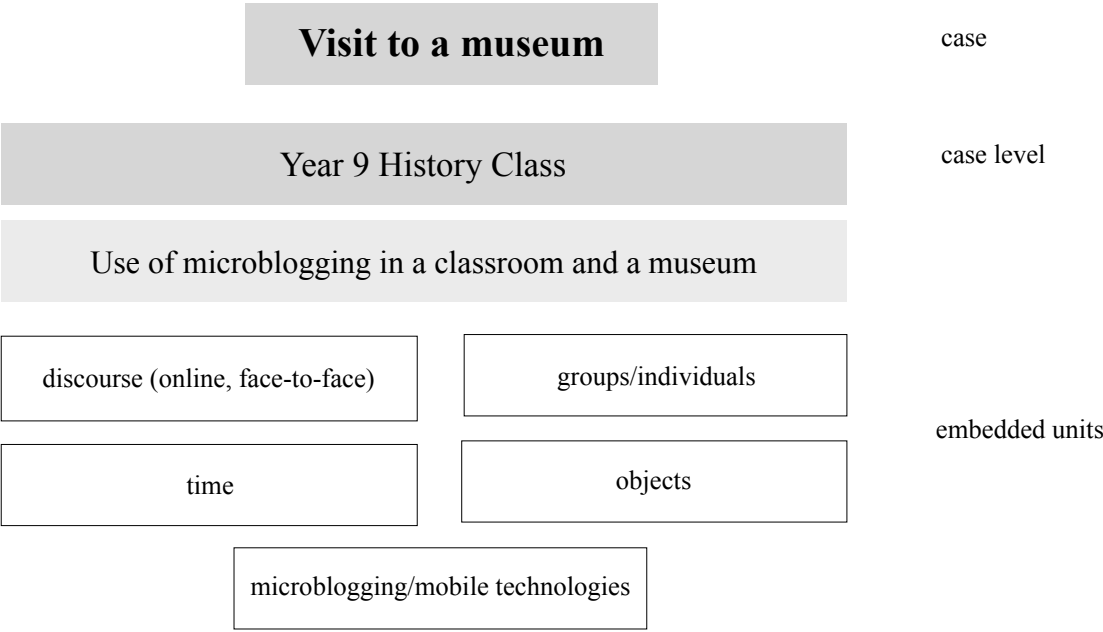


Figure 4.1 Illustration of a single case (embedded) design (adapted by Twiner, 2011)

It is further appropriate to consider another issue, which is the generalisability of the case study research findings. Different researchers have pointed out weaknesses in the case study research methodology, such as the problem of observer bias or findings not being generalisable in the way that those of social surveys are (Hammersley et al., 2000). Yin (1994) suggests that systematic use of a theoretical framework early in the research process will not only help in selecting and designing the chosen research strategy but is also crucial later in generalising results of the study. The theoretical framework in this research (see Chapter 3) directs the selection of the case and the search for empirical data, as well as the development of constructs and within-case analysis to shape theory-building research. It also helps in framing why specific relationships in the case emerge or exist, which is crucial in establishing the internal validity of the findings.

Another solution to the issue of generalisability is the use of multiple data sources which aids in achieving the triangulation of evidence in the research. Triangulation provides stronger substantiation of constructs/hypotheses and develops a robust validation of the research findings (Eisenhardt, 1989). The findings or conclusions in a case study are likely to be much more convincing and accurate if they are based on several different sources of information following a corroborative approach. Therefore in this research, the main sources of evidence are face-to-face and online discourse, video, interviews and questionnaires, combined with other sources of information including observation, meaning maps and students' presentations. These sources served to corroborate and enrich the evidence obtained from the main sources of data.

Further, validation and generalisability of findings are strengthened when they are related to existing literature. This process, although essential to any type of research, is particularly crucial with case studies. In this thesis, relating findings to the literature takes place in Chapter 8 and involves examining similarities and contradictions. According to Eisenhardt (1989), examining literature which conflicts with the emergent concepts is particularly important for two reasons. First, in the case where conflicting findings are ignored, it poses a challenge to the validity of the results. Second, conflicting literature represents an opportunity in that researchers are forced to think deeper into both the emergent theory and the conflicting literature, as well as the limits to generalisability of the research. The generalisations made from my case study research are based and progressively built on claims made in each of the three data chapters (Chapter 5, Chapter 6 and Chapter 7) on first 'what is' physically occurring in the data (i.e. tools used, who says what) and second, interpretations provided of 'what may be' a progression of events (Shofield; cited in Twiner, 2011).

Whereas a case study methodology was seen as appropriate to address this inquiry, one of the challenges was the novelty of the inquiry in that it sought to address a very contemporary issue. To my knowledge, there have been no/limited number of formal educational visits to museums where students make use of social media, and specifically microblogging. To adequately investigate the specific RQs, the way I adopted a case study methodology is largely combined with designing a classroom intervention. The methodological issues associated with conducting research in the museum context and designing classroom interventions are addressed in the following two sections.

4.1.2 Methodological issues related to museums

Numerous studies have focused on examining the conduct and experience of visitors in museums (e.g. see Falk et al., 1998; Allen, 2002; vom Lehn & Heath 2007; Yalowitz & Bronnekant, 2009). A number of data collection methods are employed, including interviews, questionnaires and observation of visitors (e.g. tracking time). Alongside these, online surveys, Web analytics and social media metrics have been recently employed to collect and analyse data on how visitors are using digital platforms and are participating in online social networks (e.g. see Villaespesa & Tasich, 2012). Overall, research has been driven by a commitment to provide museums with a greater understanding of the needs and expectations of existing and potential visitors. For example, to inform decision making around design of exhibitions or programs on offer. This body of research has been described as being committed to “understanding the effectiveness of exhibits and exhibitions and exploring the extent to which they encourage... understanding of science, culture and the arts” (vom Lehn & Heath, 2007, p.287). At the same time it has been criticised in that it mainly involves gathering data

that can be subject to measurement and quantitative analysis (vom Lehn & Heath, 2007).

The nature of the museum setting raises serious concerns about whether the use of methods and strategies often employed in formal settings, e.g. questionnaires, to evaluate learning are appropriate (Griffin, 1994). Falk and Dierking (1992), for example, found that when visitors were approached and asked about specific things they learnt during their visit, they could rarely recall specific facts or concepts. Looking at what visitors have specifically learnt as opposed to how visitors are learning is of little value in this research. Rather, this thesis examines processes that indicate that learning has taken place, such as the language used and the interactions among the visitors.

Indeed, the quality of an individual or a group's experience at an exhibit and interactions between visitors have received less attention, although it is increasingly recognised that "the ways visitors communicate their experiences to others may provide evidence of their thinking and learning" (Leach, 2011, p.36). This notion is in alignment with sociocultural premises of learning and emphasises the contextualised or situated nature of learning and socially shared cognition. This sociocultural premise of learning constitutes the theoretical framework for this thesis.

Sociocultural perspectives alongside the introduction of new techniques for tracking the conduct and interaction that arises at, with and around the exhibit, as well as accessing visitors' experiences have provided the foundation for the biggest growth of research in museums over the last two decades. Several researchers (e.g. see Allen, 2002; Leinhardt et al., 2002a) have sought for more effective ways of investigating the museum

experience. Their methods are contributing greatly to our understanding of how visitors make meaning of their visit experience, and deepening our understanding of what and how learning happens in museums. Rennie and Johnston (2004), for instance, emphasised “seeing through the eyes of the visitor” (p.8) where data must be collected from the visitor. This requires either self-report data or recording what visitors say and do. Therefore, a technique employed by Leinhardt et al. (2002b) is to ask adult museum visitors to create written artefacts (i.e. diaries) incorporating their recollections and reflections on the visit. This allowed the researchers to identify what was meaningful enough to the writers to include in their diaries, as well as the cognitive processes used by the participants to communicate information about their experiences in writing. In addition to this, Falk et al. (1998) developed a technique called ‘Personal Meaning Maps’ which is another technique that uses visitors’ own word. This technique can elicit both cognitive and affective ideas and can be administered repeatedly to demonstrate change over time (see more in Section 4.4.5).

Further to these techniques, audio and video recording of visitors’ talk are also popular techniques used in museums, where for valid interpretations visitors’ talk must be linked to their actions (e.g. see Allen, 2002; Ash, 2007). Such techniques are believed to allow a relatively unobtrusive tour of the galleries and at the same time provide the researchers with a comprehensive record of conversations and the context of where they happened. Apart from the ‘Museum Learning Collaborative’ (MLC) (see Section 2.2.2.2), the ‘Work, Interaction and Technology Research Group’ at King’s College London has contributed greatly to video-based field studies in museums. This group draws on methodological developments within sociology and in particular ethnomethodology and conversation analysis to examine “both the character and

organisation of people's response to exhibits and exhibitions and how their response emerges in and through social interaction, talk, visual and material conduct” (vom Lehn & Heath, 2007, p.288). In their work, audio-visual recordings form the principal vehicle for collecting data. Data collection is augmented by field observation, data gathered through interviews and discussion and other relevant materials (e.g. labels, gallery guides) providing in this way important resources within which to situate and understand the talk and bodily action of visitors. However, similarly to the research conducted by the MLC, this research mainly contributes to our understanding of and support for informal learning in museums and galleries. The work presented in this thesis builds on and contributes to this body of research by focusing on the experience young people had during a school visit to a museum and how the use of Twitter contributes to their experience (RQ1).

In recent years there has been a growing interest in using Web and digital technologies in museums, which further leads to a need to identify new techniques to investigate their use, which will complement traditional methods such as interviews and observation. Apart from exploring the ways in which visitors are using the technologies provided to structure their visit and examine objects (e.g. navigation, content delivery) (Proctor & Burton, 2003), there is also an interest in the consequences of the technologies for organising their visit (vom Lehn & Heath, 2003). It is important to note that mobile technologies not only provide tools for delivering content or structuring the visit but also tools for generating and collecting data. Two examples of using the technology this way are Walker’s (2010) PhD research and the *MyArtSpace* project (Vavoula et al. 2009), as discussed in Chapter 2 (Section 2.2.4).

Walker (2010) and Vavoula et al. (2009) showed that the use of the devices in the setting was effective in enabling their participants to gather information. In Walker's (2010) work the audio recordings generated by the participants enabled him to analyse their activity. In a similar way, the data generated by the participants of my study (i.e. tweets, photos) would allow the researcher to track their activity in the museum and construct their physical trails. A distinction between my work and Walker's is that this data would also involve the construction and examination of an online trail. In the *MyArtSpace* project the service allowed the students to use the resources they generated in the museums later in the classroom. Similarly, the content generated by my participants would provide resources for classroom work. However, my work also provides students with opportunities to create, share and view their resources- and their peers' resources- whilst in the museum setting, rather than integrating such activities only in the post-visit classroom lessons.

To conclude, similar to these two studies mobile technologies in the thesis are used as data collection tools, with the participants using iPhones and microblogging to create content and document their experience. My approach differs in that it also allows these technologies to be viewed as tools to enhance social interactions and foster awareness among the participants whilst in the museum setting.

4.1.3 Methodological issues related to designing a classroom intervention

A number of studies in K-12 education (6-18s) examining technology-enhanced learning are carried out as 'design-based research' or follow a 'learning design', i.e. a methodology to guide the design of pedagogically informed learning activities which make effective use of appropriate tools and resources (Conole & Fill, 2005; Conole,

2008). Design-based research methodology centres on “advanc[ing] design, research and practice concurrently” (Wang & Hannafin, 2005, p.5). In fact, its specific goal is to “directly impact practice while extending theory” (Barab & Squire, 2004, p.6).

Originally the term was introduced as ‘design experiments’ (Brown, 1992; Collins, 1992). It was used to describe experiments developed as a way to carry out formative research to test and refine educational designs based on principles derived from prior research (Collins et al., 2004). However, more recently the term ‘design-based research’ has been applied to this type of work.

Generating new theories and not simply proving existing ones is a key distinction that Barab and Squire (2004) draw between design-based research and other approaches. Indeed, for reasons such as its usefulness and applicability of theories generated to a range of contexts, design-based research has been utilised widely in technology-enhanced learning research and has demonstrated considerable potential (e.g. see ‘Technology-Enhanced Learning Research Programme’ TLRP-TEL <http://www.tel.ac.uk/>)⁴. Evaluation of the TLRP-TEL programme suggests that such projects provide evidence that can guide policy and practice and map out the territory of what academics, industry, policymakers and practitioners should recognise as crucial for getting the best out of technology (TEL, 2012).

In the work presented in this thesis, the agenda was partly decided by the researcher—facilitated by the teacher—and partly was an intervention designed and progressively refined jointly between the teacher and the researcher. It further involved collaboration with the museum staff. For the teacher, this intervention provided an alternative approach to teach history and organise a museum visit. It was therefore viewed as an

⁴ Last accessed 1 March 2015.
K.Charitonos/2015

opportunity to advance professional skills. For the researcher, this intervention provided a design that could generate evidence to address how microblogging can contribute to the students' experience in and beyond a museum. With this approach the researcher would gain an understanding and develop knowledge that could be utilised in museum or classroom practice. Indeed, the study was designed with an aim of addressing a problem involving the use of technologies in education, which is “the gap between potential and actual practice due to a lack of understanding about how technologies can be used to afford specific learning advantages” (Conole et al.; quoted in Conole, 2008, p.188).

In designing a classroom intervention there are also a number of issues a researcher needs to address. For instance, in a classroom setting the researcher is required to manage the design process, i.e. to design lessons with various resources, and cultivate the relationship with the teachers. Whereas this seems to posit a great challenge, it also provides a greater understanding of the research context (Cobb et al., 2003).

Undergoing this process arguably adds internal validity to the interpretation of the findings. In other words, the interpretation is grounded in an understanding of the research design, as well as of how the research played out in practice when enacted in a real classroom. For Hoadley (2004) such ‘enactment’ is a product of both the design and the context, mediated by the teacher and the researchers. Indeed, another challenge the researcher faces is related to the effects of a design intervention in a particular context and importantly, its implications for both the learning and the context (Hoadley, 2004).

To explain, in the study presented in the thesis the use of microblogging influenced the quantity and the type of interactions as well as the overall environment of the classroom during the project work. Moreover, issues encountered with accessing the school’s

network resulted in the teacher tweaking the lesson plans or the researcher customising the implementation of activities based on the topic-in-focus (e.g. World War II), network/ICT room availability, time constraints or the school's rules (e.g. no homework on weekdays). As a result, aspects of the context evolved in ways which could not have been predicted and therefore required constant attention. This, admittedly, was a particularly challenging aspect of being involved in a design-based research approach. It was dealt with maintaining discipline in the inquiry (van den Akker, 1999) and documenting the processes and methods of data collection and analysis in a systematic way. Evidence for the latter is provided in this chapter (Section 4.4, Section 4.5). Overall, it is argued that the researcher has to establish a balance between his/her role as a designer and a researcher to ensure that practical constraints are considered and alternative perspectives are provided (van den Akker, 1999). This dual role of the researcher might pose a limitation of this particular inquiry and is to be discussed further in Chapter 8 (see Section 8.4).

Due to the fast moving technology-enriched environment, there seems to be a constant demand for researchers, designers and practitioners to produce learning activities which take notice of this environment, and maximise the potential the technologies may offer. By employing a case study methodology combined with a 'learning design' in a classroom, this thesis contributes to this field of inquiry.

The following section describes the pilot study conducted to refine the scope of this research and to inform the choice of methods for the main study.

4.2 PILOT STUDY

4.2.1 Description of the pilot study

The main research activity in the pilot study involved designing a classroom intervention around a visit to a museum. A co-educational primary school in Limassol, Cyprus participated in the pilot study. The participants were children (N=29), all aged 11-12 years old. The pilot study was designed around the theme ‘The City in the Past and the Present’ and involved the use of two social media technologies, Flickr and Twitter. The study included a visit to the Leventio Museum in Nicosia (<http://www.leventismuseum.org.cy/>)⁵ where the children were involved in activities (e.g. collected information about objects, got engaged in conversations). It also involved a number of classroom sessions before and after the visit.

Data was collected through semi-structured interviews (N=8), observations and use of a pre-visit questionnaire (N=29). The main aim of conducting the interviews was to explore children’s views on the sessions. The duration of each interview was 15-20 min. Observation data consisted of notes and pictures taken during the museum visit, as well as data generated by students (i.e. photographs, online posts). The pre-visit questionnaire collected data regarding children’s use and familiarity with social media, the use of technologies in school and their attitudes towards museums.

4.2.2 Key Implications

The pilot study revealed some insights that were useful in the development of the main study.

⁵ Last accessed 1 March 2015.
K.Charitonos/2015

First, it was clear that the research design involving pre- and post-visit activities worked well and contributed to the continuity of the experience across contexts and time.

Second, the pilot study pointed to a limited use of Flickr, whilst a preference for Twitter emerged from the interview data. Hence, it was decided that Flickr would not be used in the main study. Observation data indicated that the participants were engaged with activity on Twitter, since they were involved in practices of reading and posting tweets.

The students could use tweets as reference points to move from individual statements to a collective narrative about a specific idea, i.e. 'markets'. A few also made use of the synchronous type of communication enabled by Twitter, which was associated with practices students were already familiar with (e.g. MSN messenger). This preference for technologies that enable 'synchronous communication' was taken into account in the design of the main study. Third, the study also verified that discussing objects, either face-to-face or online, entails a certain level of difficulty and requires prior practice. This was consistent with the questionnaire data, which showed that taking part in discussions online was not a very popular activity. Therefore, in developing the plan for the main study a provision of more structured activities online was required.

The findings of this pilot study further pointed to some useful insights on key methodological issues. First, the pilot study showed that a case study research method would be appropriate to study the use of Twitter in a museum and classroom context.

Second, the instruments used to collect data were found adequate and provided information, although a few modifications were required, i.e. more guidance for museum observation, include video to complement observation data. Third, the pilot study illustrated the risk of using online platforms as an exclusive source of data.

Various levels of participation among the participants were noticed during this study,

with a few being particularly active and generating most of the online data, whilst others had limited participation or none at all. As a result, in the main study online data was to be complemented with data from other contexts to make the collected evidence representative across the sample. Importantly, the pilot study stressed the value of engaging students in artefact creation (e.g. tweets).

In addition to these findings, key issues regarding time and resource management while conducting pre- and post-visit classroom activities emerged from the pilot study. For example, the 'Bring your Own Device' (BYOD) model (JISC, 2013) that was employed proved to be challenging for the researcher in terms of collecting and uploading students' content during school time. Regarding online observation, the pilot study pointed to a requirement for a more systematic way of capturing and archiving data. It was also observed that students' competence in using technologies was less advanced than expected. Hence, to reduce the time required for participants to gain familiarity with the technology it was decided to conduct the main study with young people in early high school (aged 13-15 years old), assuming their skills would be more advanced. Finally, the pilot study showed that it would be difficult to carry out the proposed research project in Cyprus. The development of museum web and digital resources there was still work-in-progress, and this was a restrictive factor for pre- and post-visit activities during the pilot study. Hence, for addressing the proposed research questions a shift in the context to the UK was decided.

4.2.3 Summary

Overall, the pilot study provided the researcher with useful insights to design the main study. It highlighted a design which acknowledges the dimension of time as a key factor

in museum learning. It also demonstrated the importance of allowing time for gaining familiarity with the devices and SNSs that are to be used. The findings illustrated that there was a need to shift geographical context, although methodologically, the pilot study provided a good base to develop further research design for the main study.

4.3 THE MAIN STUDY

This section describes the research design for the main study followed by the rationale behind the selection of various data collection and analysis methods.

4.3.1 Description of the main study

The research design for the main study involved a pre- and post-visit approach. It sought to integrate one Year 9 class's work on a specific area of Key Stage 3 (KS3) History curriculum into a long trajectory of whole class activities with specific goals that spanned over several sessions in both the museum and the classroom (see Fig. 4.2). The project aimed to explore how students' understanding of disciplinary knowledge (e.g. civil rights) develops over time and is realised in specific media (e.g. Twitter) visually, verbally or in writing. Organising the activities around a specific concept was among the pilot study's findings.

The main learning objective of the visit was for the students to investigate, individually and as part of a team, specific historical inquiries related to the visit's theme and the KS3 curriculum (e.g. Which methods do people use to remove inequalities in society?) (see Appendix B, Table B2). The second objective was to select evidence, i.e. historical sources, and interpret them in order to evaluate and critically reflect on their inquiries

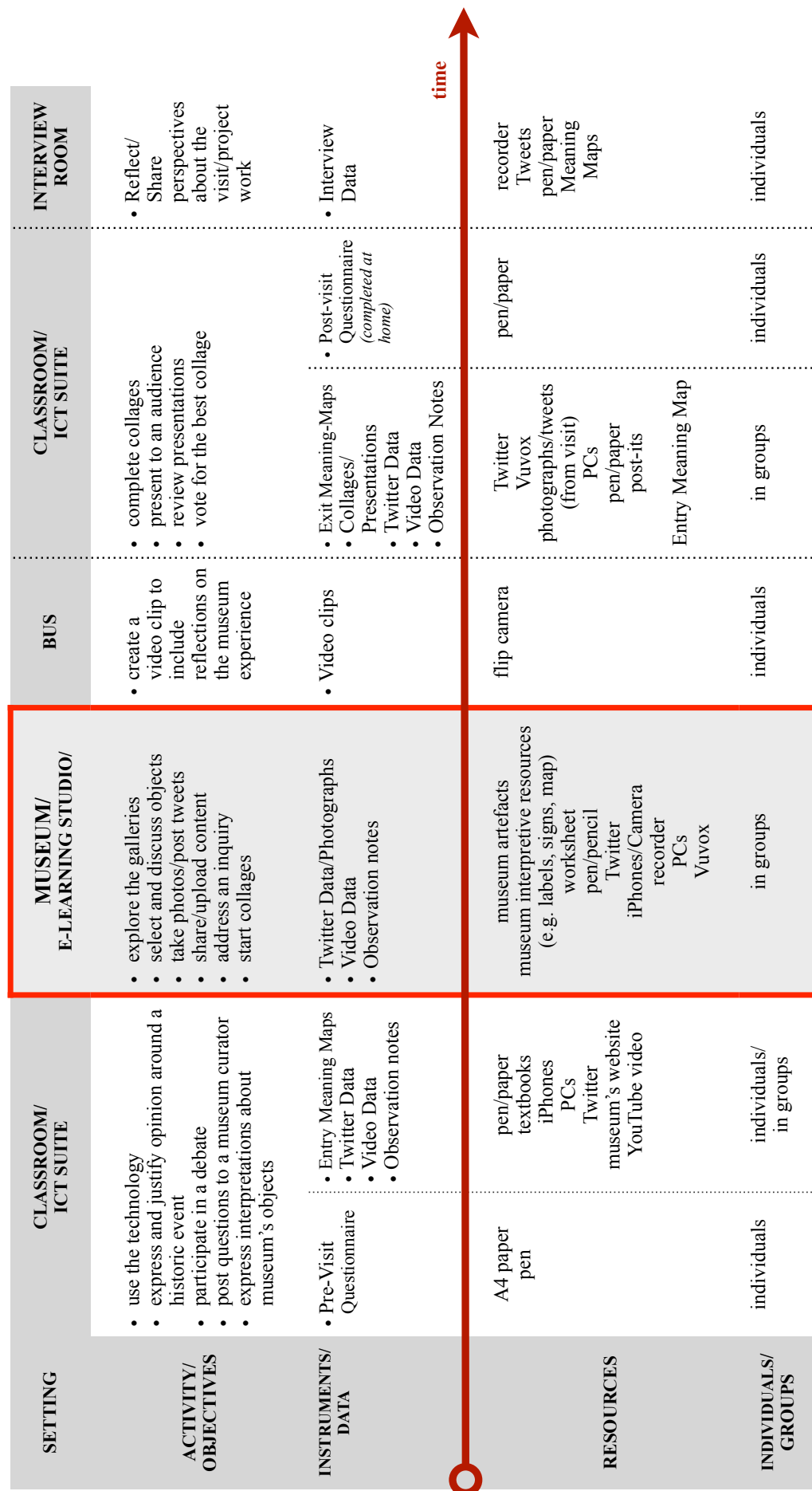


Figure 4.2 Diagrammatic overview of the research design (adapted by Steier and Pierroux, 2011)

and reach reasoned conclusions. The final objective of the visit was for the participants to communicate their knowledge and understanding to an audience.

The data was collected from a Year 9 History class (13-14s) in a secondary school in Milton Keynes. The sample of the study consisted of twenty-six students (N=26), thirteen girls and thirteen boys, of mixed ability pupils. Getting access to a school was a key aspect of the planning phase of the project. Generally, schools can be reluctant to participate in research projects. Hence, purposive sampling was employed in identifying the school and participants.

4.3.2 Procedures and Tools

The project was designed around the KS3 scheme of work 'Equality and Beliefs'. The museum visit, in particular, was designed around the theme "Get Up, Stand Up: Fight for your Rights".

Planning Phase

The planning phase of the project involved four meetings with the teacher and two meetings with the school's IT staff to discuss lesson plans, set up software and resolve access issues. Six meetings with members of staff at the Museum of London (MoL) for equipment, network and visit plan also took place. During the planning phase of the project three sessions developed by the MoL were attended to gain familiarity with the museum spaces and activities offered to schools, and at the same time to establish rapport with museum staff. This also involved piloting the worksheet with a Year 10 student, who was doing a placement at the museum.

Classroom activities

A number of lessons took place in the school before and after the visit (see Appendix A, Table A1), where face-to-face classroom lessons were combined with computer-mediated activities. Lessons incorporated Twitter and Vuvox (i.e. a tool for creating multimedia presentations) in their design. A traditional lesson around ‘civil rights’ was further facilitated by the teacher. The post-visit lessons involved students creating a collage on Vuvox that would be presented to their classmates. A lesson discussing safety on the internet and Twitter features also took place in the beginning of the project work (see Appendix C). A detailed description of the pre- and post-visit lessons is provided in Chapter 5 and Chapter 7 respectively.

Visit

In the visit the participants were divided into seven groups (of threes or fours) (see Appendix B, Table B1). Groups of threes had one iPhone, while groups of fours were equipped with two iPhones. Research suggests that an optimal number of mobile devices per group of four to five students is two (Rogers et al., 2010). Each group followed a pre-defined trail across the three Galleries of Modern London. Instructions about the trail and the activities for each gallery were given to each group in worksheets (see Appendix A). More information on the worksheets is provided in Section 4.4.6. Each group’s overall aim was to carry out some activities and collect some evidence with the use of iPhones and Twitter (i.e. photos, posts) in order to address an inquiry (four different inquiries) and eventually, after the visit, create a presentation. The hashtag #muvi was suggested for the visit, whereas the hashtags #muvi1, #muvi2 and #muvi3 were specific to the three galleries. Teacher and teacher assistants were present across the three galleries and their role was restricted to observing and assisting with

health and safety issues. Overall, the average time each group spent in each gallery was 20-25 minutes (approximately 75 minutes in total). Students also spent part of the visit in the 'Clare Learning Centre', where they were given instructions and equipment before exploring the galleries (approx. 25'), while afterwards, they had to upload content on Vuvox and return equipment (approx. 30').

Museum of London

The Museum of London (MoL) was selected as the site of the study, as the refurbished Galleries of Modern London provided appropriate links to the KS3 History curriculum. One of the themes running across these galleries is the 'Fight and Protest for your rights', which was associated with the 'Equality and Beliefs' KS3 Scheme of Work. In addition, the MoL had a strong presence online, with its collection available online and presence on the main social media platforms (e.g. Twitter, Facebook, You Tube). Furthermore, MoL is one of the three museums in London where in the 'Clare Learning Centre' visitors (including schools) are offered blended learning sessions with the use of laptops, digital cameras, camcorders, iPods and mobile phones (the other two museums are the British Museum/Samsung Digital Centre and the Victoria & Albert Museum/Sackler Centre for Arts Education). Due to having this space, MoL fulfilled some key criteria set during the planning phase of the project such as a space to gather and reflect on the visit experience, infrastructure (digital equipment e.g. digital cameras, iPods and iPhones to borrow, Internet in the galleries) and equipment to allow the researcher to collect students' content generated in the museum (e.g. photographs). The museum also offers learning programmes with digital technologies, which the researcher could attend and draw on, to design a programme for the participants.

Twitter

Twitter was selected as the main tool for the study as it has both synchronous and asynchronous attributes, and it also introduces the possibility of enhancing the dialog ‘diachronically’, i.e. endured in time (Elavsky et al. 2011, p.6). Research has shown that it can be used as an educational tool as it provides an opportunity for interactions and feedback (Elavsky et al., 2011, Junco et al., 2011) (see Section 2.1.4 for a review). As a result, Twitter would allow the researcher to collect participants’ reactions to what they experience at the MoL. Twitter has a simple interface, therefore teenagers (13-14s) could engage with its user-friendly features without any complexities. Another advantage of selecting Twitter was that it could be used even in the case of a 3G network not being available in the museum setting. This was feasible because in the UK users could update their status by using a text messaging service available in the mobile phones, i.e. Short Message Service (SMS). Finally, due to the short text format, it was assumed that Twitter would not create the ‘heads-down’ effect (Hsi, 2003) that would distract students in their encounters with artefacts.

4.3.3 Data Collected

Data was collected over a period of twelve weeks during the Spring Term of the 2010-2011 academic year (January 2011 - April 2011), in the classroom/ICT suite and the museum. An outline of the data collection phases is provided in Appendix A (Table A1).

In the school setting, data was collected in the form of observation notes from all the lessons. Data from Twitter, video data in the classroom and the museum, collages and presentations, Personal Meaning Maps and questionnaire data were also collected.

In the museum setting data was collected (from the researcher and the observers) in the form of observation notes, audio recordings (not used in the analysis, as this data was not comprehensible) and content generated by students during the visit (i.e. posts, photos, notes on worksheets). Interviews with the students and the teacher took place after the completion of the project. Data included audio recordings and transcriptions of interviews. A detailed analysis of these methods is provided in Section 4.4 that follows.

4.4 DATA COLLECTION METHODS

4.4.1 Interviews

The interview is a frequently used method in the social sciences, because “it enables participants to express how they regard situations from their own point of view” (Cohen et al. 2009, p.349). It sheds light on an individual’s thoughts, emotions, motives, beliefs and attitudes to specific facts and issues addressed by the interviewer. This method allows a “very detailed and comprehensive talk” (Rapley; quoted in Silverman, 2006, p. 111) that may supply direct information and access to one’s experience (Hammersley & Atkinson, 2007). For this reasons interviews were used in this inquiry because it enabled a participant who has experienced both the visit and the intervention in the classroom to narrate this experience and share it with the researcher.

An issue often cited as problematic with this method is that these accounts are always subject to the researcher’s interpretation. In the work presented in the thesis this was addressed by ensuring that the data collected from the interviews were always cross-checked with data collected from other instruments. The researcher’s active involvement in the study positioned her better to effectively understand the context of

an interview and thus to assess the accounts produced and anticipate the ways in which they may have suffered from biases of any kind.

Another issue is that most of the problems inherent in interviewing are due to the discrepancy which can often appear between what people say and what people actually think and do. Still, interview data may have the capacity to reveal a tendency of how people act under given circumstances. Therefore, one should not reject such accounts on the premise that subjectivity or reactivity threatens their validity. Essentially, interview accounts should be assessed like any other data collected from other sources. In other words, never accepted at face value, rather examined in relation to other sources of data. My aim, overall, was not to gather data free from potential bias as it is acknowledged that this is unfeasible in social research. Rather, in line with Hammersley and Atkinson (2007), the aim was “to discover the best manner of interpreting whatever data [I] have, and to collect further data that enabled [me] to develop and check [my] inferences” (p. 102).

4.4.1.1 Use of interviews in the study

Based on the approach suggested by Wilson and Powell (2001), in each of the interviews the students were allowed to do most of the talking. The interview started with some open-ended questions and progressed to more specific questions. Overall, the researcher’s aim was to make the interviewees feel comfortable with the topics discussed. The interviewees were allowed to raise any points and issues they considered relevant, whilst being directed to the specific areas of interest. Overall, the intention was to reinforce a sense that their views and opinion were valued and appreciated.

The interview was structured around five areas: (1) the visit experience; (2) the classroom sessions; (3) the use of the technology; (4) the Personal Meaning Maps; and (5) the session with the museum's curator (see Appendix A, Table A2).

In total eleven students were interviewed: six boys and five girls. The interviewees were selected based on: (1) group formation, i.e. at least one participant per group; (2) participation online, i.e. high participation, average participation and no participation; (3) time constraints; and (4) students/parents' consent forms. The interviews took place over three sessions after the project was completed. Due to time constraints seven students were interviewed individually, while two pairs of students were interviewed together. Each interview on an average lasted 15min; the two group interviews lasted 25-30min (see Appendix B, Table B2).

The interview with the teacher was structured around two main areas: (1) self-related questions; and (2) students/class related questions. The focus was on the project work, students' learning and the use of technology (see Appendix A, Table A3). Overall, the researcher's intention was to get the teacher's perspective on the project work and on her students' participation and performance.

The interview with the teacher took place after completion of the project and lasted approximately an hour (see Appendix A, Table A1). All the interviews were recorded and transcribed. A description of how interviews were analysed is provided in Section 4.6.1, while interview data is presented in Chapter 7.

4.4.2 Observation

The major advantage of observing the participants is that it allows the study of participants' knowledge in a natural setting and the identification of their behaviour, without relying on second hand accounts (Cohen et al., 2009). My study involved direct observation (structured and unstructured) in order to study the participants in their natural environment and to collect rich data relating to how they responded to different learning environments and tools.

The participants were aware of the researcher observing them. Employing direct observation however, raises a concern about whether the participants are 'playing to an audience' (Bernard, 2011, p.306). However, the length of this study and being involved in the design and implementation of the project, resulted in building rapport and trust with the participants. Hence the participants were unlikely to change their behaviour as they were used to the researcher's presence. Another issue to consider about this technique is that the data collected and the interpretations made largely depend on the different positions the researcher takes between participation and observation. This is particularly important due to the study being designed as a classroom intervention. A solution, also indicated by the pilot study, was to complement observation with video recording. Overall, the employment of a variety of data collection sources enabled validation of observation data. Inevitably, an observer's bias cannot be eliminated entirely. Yet, having previous experience in both a classroom and a museum provided me with a valuable set of skills necessary for accurate observation.

This study involved three different spaces in which observation was going to take place (i.e. online, museum, classroom), each with its own theoretical perspectives and

limitations in relation to the collection of data. In the next section, I elaborate on observation taking place in such spaces.

In museums, observation is a method widely used and a considerable body of work is already conducted and published (e.g. see Allen, 2002; Yalowitz & Bronnenkant, 2009; Zwinkels et al., 2009; vom Lehn, 2011). Observation of students was included to identify actions and facts that would be preconditions for learning and non-learning situations. It could also identify the places in the museum or areas in the visit design and assess how the environment-and importantly how the technologies-were contributing to the students' experience. Observation helped in empirically assessing whether there were necessary conditions (even if they were not yet sufficient) throughout the visit, so that learning could take place.

Classroom observation was an important part of the research design and provided an overview of what was happening in the classroom/ICT suite. The major advantage of being present in the classroom at all times was that it provided the researcher with a basis for accurate descriptions of what was taking place in the setting. It also allowed information about classroom dynamics to be collected. Additionally, due to attending a number of history lessons the researcher gained familiarity with how a regular lesson was structured. This positioned her well for designing classroom activities.

In this study, the observation data consisted of notes and pictures taken during the classroom sessions and the museum visit, video data, as well as data generated by the students online (e.g. tweets) and on the mobile phones (e.g. photographs). This data is used in the three analysis chapters (in Chapter 5, 6 and 7). Observation data was also

related to how the participants were responding to different learning environments and tools, and was cross-checked with interview data. Further information on how observation data was collected is provided below.

4.4.2.1 Use of observation in the study

Observation in the museum

In total six adults, including the researcher, were accompanying the students and one—not necessarily the same person—was present in each gallery at all times (i.e. a fellow researcher with a video camera, a friend of the researcher with a digital camera, and three teachers/teacher assistants).

Based on the findings of the pilot study, a semi-structured observation sheet (Hein, 1998) was prepared and handed out to each of the observers, with an aim to note where the groups were at all times (Allen, 2002) and especially when the attention of the students was focused on the mobile phone (Hsi, 2003). The observation sheet provided some guidance about what to look for and prompted the observers to attend to specific actions (see Appendix A, Fig. A1). An open-ended section was also included to describe the students' actions. Although the students had the worksheet to use, they could take in the information only partially or even take no notice of it, thus the role of the observer was key.

One observer and the researcher completed parts of the observation sheet. As expected, completion was not feasible for the observer in control of the video camera, so her observations were shared with the researcher after the visit. Similarly, the teacher

expressed general observations on the bus on the way back to the school. Notes from both interactions were taken. An email with brief notes from another teacher who was present in the visit was received, whilst it was not possible to contact the sixth observer.

Observation in the classroom/ICT suite

A ‘Research Diary’ was used for keeping observation notes. Brief notes were made during the lesson, whilst a longer, detailed description was written once a session was completed, on the same day that a session took place. An unstructured approach was employed in classroom observation, documenting as much as possible about the setting and the participants. The longer description written post-session had the form of a narrative. Here descriptions of, as well as my reflections and interpretations about, the activities were included in an attempt to identify initial themes of interest, but also as a way to improve the design of activities. In the research diary, notes of meetings with the teacher, museum staff and school’s IT staff were kept, as well as observation notes of what was happening on Twitter. The latter is the topic of the next section.

Observation on Twitter

The project’s account on Twitter (@MuseLearn) was set up as a protected account and it only followed the participants of the study and the MoL Twitter account. Twitter observation included tracking the activity on Twitter, participating, and archiving the tweets posted in and beyond school.

The pilot study indicated the need for a more systematic way to document the activity on Twitter. Therefore it was decided that I would log onto the project’s account twice every day, i.e. after school and in the evening. Another decision was to post at least one

tweet on the day of the sessions, e.g. reply to tweets, ask for the students' opinion about a classroom session, post pictures of objects, repost tweets from the MoL, elaborate on things posted during the classroom sessions. The intention was to maintain a friendly tone in these tweets.

A systematic observation was also taking place by documenting as much as possible in the research diary about interactions taking place or any other information that would provide the researcher with a better understanding of how the students were using the tool. Archiving of the tweets was taking place twice in a week, directly after the classroom lessons were completed. Methods included: (1) taking screenshots of the Twitter stream on specific dates, specific activities and per student; (2) copying the Twitter stream per date and session into a Word processing document; and (3) retrieving the data through a service that tracked and archived Twitter hashtags, i.e. TwapperKeeper⁶.

This process of archiving the tweets ensured no data was lost, especially since one concern was that Twitter did not provide a user with access to his/her archive⁷. Also, going through this process allowed the researcher to maintain a familiarity with the activity on Twitter, and an overview of what each of the participants was doing. Data collected on Twitter is presented in Chapter 5, Chapter 6 and Chapter 7.

4.4.3 Video

The review of the role of social interaction in museum learning (see Section 2.2.2.2) revealed that interactions among visitors can potentially uncover the processes through

⁶ TwapperKeeper service was discontinued in 2011.

⁷ This feature has been improved since the implementation of this study.

which they construct and negotiate meanings. Therefore video was used to examine the role of talk, artefacts and tools, as well as features of the settings in the students' experience. Video technologies offer

enhanced observational power...and powerful 'microscopes' that greatly increase the interactional detail that can be obtained and permanently stored for comprehensive analysis and reanalysis by multiple investigators.

(Derry et al., 2010, p.6)

Importantly, video technique was viewed as allowing conversations to be recorded that would be difficult to hear using any other technique in a museum or a classroom, whilst it also captures verbal and non-verbal aspects of a conversation (Callanan et al., 2007).

In my inquiry, video was used as complementary to data from other sources.

Analysis of video data is a time consuming process and usually only brief episodes are analysed (Goldman, 2007). Lemke (2007) claims that due to this "we magnify small details and minor events out of all proportion to the flow of the activity on a longer time scale" (p.45). As a result, he calls for developing meso- and macro-scale uses of video to balance the micro-scale uses that most researchers undertake. In this thesis this concern is addressed by adopting Ash's (2007) approach to video analysis, which takes into account the micro-, meso- and macro-level of the activities recorded (see Section 4.5.4.1).

Another issue to consider when using a video camera is the role of the camera.

Goldman (2007) argues that the medium of video "affects and changes the culture one is studying from the moment the camera is turned on" (p.5). Indeed, people might engage in performative actions whenever they are being observed. In my study, the participants

were aware of being recorded. As such, no claims can be made as to whether they behaved on the camera as they would off camera. However, it is my view that this limitation should not refrain the use of video in any study. Rather, in line with Barron I agree that

although it is possible that the video camera may have influenced student behaviour, it is difficult to predict in which direction. Being recorded could as easily have been as distracting as facilitating with respect to the attention of the student participant

(quoted in Goldman, 2007, p.5)

4.4.3.1 Use of video in the study

Museum

A key decision regarding video technique during the visit involved using a mobile camera instead of a static one, e.g. placed next to a specific object. Allen (2002) suggests that static recording devices can only catch conversations over small intervals of time. Although this was a common practice in previous research in museums, given this study's RQs it was decided to have a mobile camera to follow a group of students across the museum galleries. Such a recording would allow the researcher to gain an understanding on how the participants made use of technologies, objects and artefacts over time. Further to this, it would be easier to understand the personal or social contexts being unfolded during the visit when studying the whole of a group's conversations rather than a few minutes interaction in front of a specific object. The camera was handled by a fellow researcher. Apart from the camera, a bluetooth microphone was attached to one student to allow good quality audio recording of the

students' talk. This was due to the huge amount of ambient noise observed in museums (Allen, 2002; Hsi, 2003). Bluetooth technology was also used in an attempt to limit the video effect. The wireless microphone allowed for the recording to take place a short distance away in order not to disrupt the natural flow of the students' interactions. This technology made the recording process far less intrusive, while most of the interactions were recorded. A tension, however, might have been created due to the use of the camera. In two instances in the video students acknowledge the presence of the camera, while their comments indicate that they were not indifferent. However, there is no other evidence in the video for the researcher to infer that the talk and visible conduct at, with and around objects were not naturally occurring, especially since various opportunities for free dialogue have been given to the students.

In total, the video recorded in the museum lasts approximately 55 minutes and consists of two parts (i.e. before and after lunch). Video analysis of specific episodes is presented in Chapter 6.

Bus

On the way back to the school as soon as the visit was over the students were asked to use a Flip Video Camera to create short videos of themselves while sharing some thoughts about the visit. The aim of this activity was to aggregate multiple points of view and capture students' first impressions of the visit, while still fresh in their minds. These accounts could be cross-checked with students' other accounts. It was based on the video's potential to facilitate the reflective component of students' visit experience and the assumption that video recording would appeal to the students more than writing, resulting in a better response rate.

Four Flip Video Cameras were handed out to students. Each camera had instructions attached to it, where students were invited to share their views about their experience. Alongside this, some guidelines about what they might refer to were provided, i.e. “*You could for example refer to...*” (see Appendix A, Fig. A2).

In total, eighteen videos were collected by twenty-two students. Analysis of this data is presented in Chapter 6 (Section 6.2.6).

Classroom

In total six sessions were video recorded in the school (see Appendix A, Table A1). A key issue in relation to the use of video in the classroom was to decide which elements of this environment should be recorded (Derry et al. 2010). In line with the purposes of this inquiry the camera was set up to focus on a particular group of students rather than the teacher. Due to specific restrictions imposed by the setting (e.g. seating plan, electricity supply), a still camera was set up in the right-hand corner of the classroom and focused on a specific table (Fig. 4.3). As a consequence, who was recorded depended on the students sitting on the specific table.

Similarly to the museum visit, a wireless microphone allowed me to video record the students working a short distance away. This made the recording process far less intrusive. Most of the interactions among the pupils from the table-in-focus were recorded. However, due to the ambient noise in the classroom, some instances in these interactions were not recorded with clarity.

Video recording of the classroom sessions enabled the researcher to gain an understanding of the context where specific interactions took place, e.g. learning objectives, teacher's instructions, and provided a rich picture of the dynamic teaching-learning experience. Further, it enabled me to do more justice to the complexities of teaching and learning activities, especially with the use of technologies, to provide accurate interpretations of the events presented.

In total 340 minutes (approximately 5.5h) of video recording in the classroom was collected. Analysis of this video data is presented in Chapter 5 and Chapter 7.

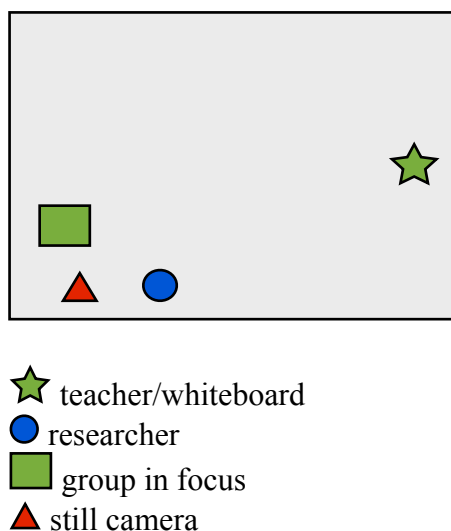


Figure 4.3 A diagrammatic representation of camera's position in the classroom

4.4.4 Questionnaires

The questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical data and comparatively straightforward to analyse (Cohen et al., 2009). Pre- and post-visit questionnaires (QI and QII respectively) were used in this study, because this technique enabled data

collection from all the participants. As a result, comparisons across the sample were allowed, while data from closed questions were seen as straightforward to code and analyse compared to word-based data (Oppenheim, 1992, p.115).

An issue often cited as problematic with this method is that the categories are not 'exhaustive' and there might be a bias in them (Oppenheim, 1992, p.115). Also, respondents cannot add any explanations to the categories and cannot receive clarifications in the questions, thus creating scope for misinterpretations. Therefore, in addition to closed questions, open-ended questions were included in both the questionnaires administered to the participants. The respondents were invited to provide information in free text format. These responses could be used to corroborate answers to closed questions or highlight problems with particular questions (O'Cathain & Thomas, 2004). Finally, they could capture the specificity of a particular situation and allow explanations to be written, as well as collection of rich and personal data (Cohen et al., 2009).

Additionally, when administering a questionnaire to the participants it was essential that the language and the concepts used were appropriate for the target group or provide explanations (e.g. social network sites). It was also important to provide the children with the option of indicating that they had no opinion or did not know the answer, because children usually feel they ought to respond, even when the question does not apply to them (Cohen et al., 2009).

4.4.4.1 Use of questionnaires in the study

The pre-visit questionnaire (QI) was structured around the following major areas:

- A. personal information about the participants, with a focus on access to technology at home (Questions A1-A8);
- B. information regarding the participants' use of the Internet (Questions B1-B5);
- C. information regarding the participants' use of Social Network Sites (SNSs) (Questions C1-C8); and
- D. information regarding the participants' views on using/visiting museums (Questions D1-D16) (see Appendix A).

The post-visit questionnaire (QII) was structured around the following main areas:

- A. views regarding the visit to the Museum of London; (Questions A1 - A7) and
- B. views regarding the use of Twitter and Vuvox in the classroom during the history lessons (Questions B1 - B4) (see Appendix A).

Both questionnaires included Likert scales, i.e. ten in QI and three in QII, which consisted of a statement and a range of pre-defined responses that measure the intensity of a participant's feelings towards the statement. The statements in two particular questions (QI/Part D, QII/A1) could be grouped on the basis of a construct that underpinned them (e.g. learning, interpretation, technology). Most of the Likert scales consisted of five items, ranging from strongly agree to strongly disagree. The mid-range of the scale is a 'neutral' option (i.e. 'neither agree nor disagree'), which was included to give an option to participants who truly could not respond. Including this mid-value, however, comes with an acknowledgment that this might be problematic due to 'social desirability bias' (Garland, 1991, p.70) arising from respondents wanting to please the interviewer or appear helpful or avoiding voicing extreme opinions. In other words, it is

argued that when provided with a ‘safe’ choice at the centre of the scale, respondents are likely to select that, rather than reveal their ‘true’ opinion.

Another issue related to Likert scales involves recognition that these scales produce ordinal data, i.e. data that can be ranked. There is a long running dispute as to whether Likert scale data can be treated as interval data, that is data that is in specific order and distance measurement is possible, and hence the means can be calculated. Allen and Seaman (2007) reject this position and take the view that Likert scale data should not be treated as interval data, similarly to Jamieson (2004) in the paper ‘Likert scales: how to (ab)use them’ in *Medical Education*. On the other hand, Norman (2010) argues that the concerns about Likert scales are not serious, therefore means and other parametric statistics can be employed. In this thesis, similarly to Jamieson (2004), I view the response categories in Likert scales as “hav[ing] a rank order but the intervals between values cannot be presumed equal” (p.1217). In other words, in the questionnaires administered to the participants of this study it is not possible to presume that the distance between ‘Strongly disagree’ and ‘Disagree’ is the same as ‘Neither agree nor disagree’ and ‘Agree’. As a result, non-parametric statistics are used that are appropriate for ordinal data, i.e. Median, Inter-quartile Range. Further discussion on the analysis of the questionnaire data is given in Section 4.5.5.

QI also included a scale consisting of three items (see A1 - ‘Yes/No/I don’t know’) while QII included a scale consisting of ten items (see A2 - Scale 1-10). Most of the statements used in QI and QII were similar to questionnaires used in previous research (RCMG 2004; Lenhart et al., 2007; Charitonos, 2010). Other statements were modified to fit the purposes of the study (see Appendix A).

Several open ended questions were also included. In QI a few of these questions were added to the end of a list of response options to extend and ensure that all options are covered, i.e. ‘Other’ in QI/B4 (see Appendix A). One open question (in QII/A4) asked the participants to expand or elaborate, while most open questions were general ones, i.e. to elaborate on their general experience in relation to the overall topic of the survey (e.g. in QII/A7).

The questionnaires were handed out to the participants before and after the project. QI was completed in the classroom, while QII was completed at home (see Appendix A, Table A1). In total, twenty-two (N=22) pre-visit Questionnaires (QI) and twenty-three (N=23) post-visit Questionnaires (QII) were collected. The data from the questionnaires are presented in Chapter 5 and Chapter 7 respectively.

4.4.5 Personal Meaning Maps

‘Personal Meaning Mapping’ is a research methodology developed by John Falk and associates at the Institute for Learning Innovation, specifically targeting museum learning. It is based upon the premise that learning is a constructive process. It is, therefore, designed to measure how a particular learning experience, such as a visit to a museum, affects an individual’s views and understanding about a particular topic/theme before and after a visit.

The technique has been employed by some researchers to assess learning in museums (Falk et al. 1998; Adelman et al., 2000). Its main advantage is that it is open-ended and offers participants some time “to reflect on their feelings and thoughts through free association, and thus elicits deeper responses” (Stylianou-Lambert, 2009, p.146).

Overall, by drawing on Falk et al. (2007), the value of using personal meaning mapping in this particular inquiry is seen as threefold : (1) it facilitated the identification of a student's prior knowledge, concepts, attitudes and vocabulary (baseline) about a particular term (i.e. 'civil rights'); (2) it provided a mechanism for assessing how—and if—the museum visit contributed to students' thinking about 'civil rights', as well as what meanings the students chose to make from the museum experience; and (3) it provided a mechanism for assessing the relative and unique impact of a single educational experience across different students.

The use of personal meaning mapping in this study neither assumes comparable knowledge and initial experience among the participants nor requires a 'right' answer against which it will be assessed in order to demonstrate learning. Rather, the assumption underpinning the use of personal meaning mapping in this study is that both the visit to the museum and the classroom sessions had an effect—small or big—on participants understanding around the term 'civil rights'. As a result, a personal meaning map (PMM) is viewed as an “individual's personal construct” (Lelliot, 2009, p.107), a tangible outcome of whatever learning took place because of the intervention in the classroom and the visit. Further, the use of the specific research technique comes with acknowledgement that in every learning event “there are delays between an experience and genuine understanding” (Oakes & Lipton; quoted in Adams et al., 2003, p.17). Therefore, there are aspects of the experience that cannot be properly articulated or even revealed on a PMM. This does not necessarily mean that learning did not occur. In my study PMMs are not employed as the only method for examining what meanings the student chose to make from the museum experience. Rather, it is a technique

complementary to other data collection methods and overall is viewed as a tool to increase understanding of learning processes taking place over certain time.

It is acknowledged that the literature predominately reports applications of this technique in informal learning in museums. However, in the study presented in this thesis the particular visit was designed as a visit to a semi-formal setting and had, consequently, some pre-set objectives associated with the curriculum. What is more, the setting for the PMM data collection was different to many studies using PMM. As in Lelliot's study (2009), the data was collected in the school classrooms of the selected participants in the study. A few limitations posed due to the setting will be discussed in the next section.

4.4.5.1 Use of Personal Meaning Maps in the study

Prior to the visit to the museum each of the participants was asked to create a meaning map about the concept 'civil rights'. The terms were selected after consulting the teacher and were related to the 'Equality and Beliefs' KS3 Scheme of Work. Each student was given an A4 blank paper (entry-PMMs), where the cueing phrase displayed at the centre of the page was 'civil rights' (see Appendix A, Fig. A3). Students were asked to write down as many words, ideas, phrases or thoughts as came to mind related to the cueing phrase. The teacher emphasised that this was not a test and that they should feel free to write "words that are linked to civil rights" or "key people they know and they were involved with civil rights or it could just be a definition of civil rights". She further prompted them to think generally about 'rights'. The time allowed for students to complete the entry PMM was ten minutes (10 min). The completed PMMs were handed to the researcher.

Upon completing the entry-PMMs, the teacher facilitated a short discussion with the whole class about ‘civil rights’. Observation notes were taken during the session. The session was also video recorded and a transcript of the session was made. Its transcription was cross-checked with the observation notes for the analysis purposes.

Following the visit, and similar to other studies (Falk et al., 2004; Falk & Storksdieck, 2005), each participant was given back his/her original A4 paper. They were then asked to review the entry-PMM and add, delete, modify, or change what they had already written on the paper by using a different colour ink from the original. In other words, the exit-PMM also included the responses from the entry-PMM, unless these were deleted or modified in the process that followed the visit. Ten minutes were given to the students in this stage before the completed PMMs were handed to the researcher. The colours each student used in both the entry- and exit-PMM were noted into an Excel spreadsheet soon after each session was completed. In total, twenty-five PMMs were collected (entry-PMMs=25; exit-PMMs=23).

As with the entry-PMM, these additional/modified comments did not form the basis of an open-ended, follow-up interview—an approach used by Falk and his colleagues (Falk et al., 1998). During the interviews a number of students (N=8) were invited to reflect and elaborate on their PMMs by responding to the question “Can you please guide me through your meaning map?”. They were also prompted to ‘re-visit’ and update it for a third time, if they wished. Time restrictions did not allow for all the interviewees (N=11) to talk about the maps. It should be noted that during the interview the researcher did not direct students to elaborate on specific phrases in their PMMs,

rather, the aim was to elicit interviewees' free responses as well as examining where the students chose to refer to.

Apart from time restrictions, the classroom setting had other constraints. For example, chatting within groups could not be avoided due to the seating arrangements in the classroom. Another issue to consider is how the exit-PMMs were handed out to the students (i.e. handing out the original one), as this might have influenced the additions made. It is acknowledged that completing a new map might end up with new ideas expressed. However, reviewing the original map has been reported in previous studies with PMMs (Adelman et al., 2000; Falk et al., 2004; Falk & Storksdieck, 2005). In fact, Falk and Luke (personal communication with Lelliot, 2009) emphasise that it is essential to have the original paper given back to the participants instead of asking them to fill a new one, because this ensures that participants do not feel that they are repeating what they have already done. It further allows them to alter their original ideas. Finally, as already mentioned, discussion about the PMMs took place with eight interviewees, rather than with all the participants. However, this led to some limitations with regards to the analysis of the data collected and is discussed further in Chapter 7 (Section 7.3.1).

Overall, the data collected from the PMMs provided a good mechanism for establishing baseline information, which could then be compared to exit-PMMs and students' understandings and attitudes after the visit and the project were completed. The data collected from PMMs is presented in Chapter 7.

4.4.6 Worksheets

Museums use a variety of strategies to facilitate and structure visitor experiences, such as guided tours, worksheets, thematic trails, audio guides and others. In school visits, in particular, it is common practice to see students working on written assignments during their visit as a means of managing students and keeping them on task and focused. Furthermore, in a museum context worksheets may be serving the role of ‘advance organisers’ (Kisiel, 2006), i.e. helping teachers and students to organise their visit. Similarly, in this inquiry, the visit was complemented with moderately structured worksheets (see Appendix A).

Kisiel’s study (2003) showed that more than forty percent of upper elementary teachers surveyed would use some sort of structured engagement during museum visits.

Worksheets, hence, may be viewed as recreating a more controlled classroom-like situation with which teachers and students are familiar. However, the use of task-oriented teaching practices in a museum setting—often through worksheets—results in the criticism that classroom-like constraints are imposed on a visit to an otherwise ‘free-choice’ learning environment (Griffin & Symington, 1997, p.775). Price and Hein (1991), for example, found that worksheets might be useful for focusing observations and assisting with identifying artefacts, but at the same time they can actually inhibit true observation, prevent students from formulating their own questions and cause students to focus on narrowly described task to the exclusion of broader questions. This is verified by Griffin and Symington (1997), whose study reports a general dislike towards the use of worksheets. Students’ accounts indicated that having to complete a worksheet distracted them from looking at exhibits and took away their learning

choices. The same students, however, identified learning as directly associated with the type of activities that were on the worksheets.

To address the issues associated with using worksheets in school trips the worksheet designed for this study was based on research which suggests allowing control and choice to students (Griffin & Symington, 1997; Falk & Dierking, 2000) or points to the need to combine structure and free exploration (Smith & Tinio, 2008). Griffin and Symington (1997) indicate a strong emphasis on choice and control of students' own movement and learning, as well as a link to school studies and a preference for working in a social grouping. Further, Bamberger and Tal (2007) found that activities of limited choice offered scaffolding, allowed the students to control their learning, and enhanced deeper engagement in the learning process. In other words, 'controlled choice' (Bamberger & Tal, 2007) is proposed as key in designing the worksheet and making best use of the special opportunities of the museum setting.

4.4.6.1 Use of worksheets in the study

Worksheets were used to facilitate and structure the students' engagement with the exhibits and technologies. Ultimately, the aim was to anticipate any reluctance the students might have had to use the technologies due to lack of familiarity about using them in a museum context.

Worksheets were designed in consultation with museum curators and the teacher to provide a trail through an array of artefacts and orientation cues in the galleries, as well as to facilitate students encountering objects. Students were directed to use the technologies, whereas the 'online space' dimension of this particular visit was also

highlighted. Another reason for the worksheets was to sustain some characteristics of museum visits that participants had in the past, thus keep tension low, i.e. combine novel aspects of introducing technologies and traditional aspects. Importantly, worksheets also aimed to allow different temporalities and spatial movement in students' exploration of the galleries, since 'time' and 'space' were key concepts in the research design. In the visit students were to work under different temporalities; to encounter objects at different time slots and visit specific spaces periodically. This marks a difference between this visit and visits reported in previous research.

To address some of the issues discussed in the previous section the visit design used the 'controlled choice' effect (Bamberger & Tal, 2007) by allowing a gradual shift of choice over control in the activities in each gallery. Discussions that the researcher had with museum staff in the planning phase of the study reinforced this notion. Beyond this, to encapsulate 'time' and 'space' concepts in the design of the study, four worksheets were created (Blue (B) Green (G), Purple (P) and Red (R)). Each worksheet suggested a different trail. No other difference existed in the four worksheets, other than the movement across galleries. What is more, to avoid having two groups of students in the same location/display the same time, each worksheet had two versions (e.g. B1 & B2, G1 & G2) where the same tasks were given in slightly different order.

The worksheet had three sections, one for each gallery. On average, eight tasks per gallery were included (n=24 questions). It also included orientation cues, instructions for the visit and activities to be completed in the museum's e-learning studio. For example, to address the problem identified in the *MyArtSpace* project with students collecting large amounts of information (see Section 2.2.4.2) the intention was to allow

students time in the museum to reflect on the inquiry and select which photos they would take with them back into the school. Due to time restrictions during the visit, none of the extra group activities was implemented. Note that completion of the worksheets was not obligatory for the students.

The worksheets had been developed for the specific topic being studied (i.e. 'Equality and Beliefs'). Some tasks in each gallery were particularly structured and controlled to allow students an orientation period to familiarise themselves with the space and scaffold observation with specific objects. It was further designed to give students with little or no knowledge about museums or exhibits 'a place to start' (Walker, 2008, p. 116). Gradually, the tasks were becoming less structured and more open-ended, by letting the students choose where they would apply some of the tasks (e.g. "Pick up any object(s) from this gallery that you think is related to your inquiry. Describe it and state why you selected it..."). The last activity in each gallery allowed students to pursue their own interests, based on research advocating that worksheet task density be lessened or minimised to allow students time to pursue their own interests (Kisiel, 2003).

Tasks suitable for the learners' abilities were included in the worksheets, aiming to accommodate different levels of student expertise and experience (Kisiel, 2003).

Activities encouraging social learning were also included (e.g. tasks acknowledging other groups and aiming to foster group interactions). Multimodal responses were encouraged (e.g. visual and textual) and a variety of response formats were required (verbal, written). Also, explicit instructions to post their observations on Twitter were given. The expression 'Tweet this' was included in most of the tasks.

The worksheets were handed out to the students in the museum and were collected by the researcher in the lesson following the visit. In total seventeen worksheets were collected (N=17). Appendix A includes a full copy of a worksheet. Data from the worksheets is included in Chapter 6.

4.4.7 Students' presentations

The research design of this study sought to integrate an organised post-visit reflection activity to emphasise the cumulative nature of learning. In Kisiel's study (2003) teachers interviewed reported limited plans for follow-up activities that would support the visit. Although limited connections to the classroom practice seems to be the case for many school visits, however, literature highlights the importance of post-museum visit reflection activities to revisit out-of-class learning experiences and to build on them in order to maximise learning (Rennie, 2007). Anderson et al. (2000) provide evidence to show that an integrated series of post-visit activities in their study resulted in students constructing and reconstructing their personal knowledge of science concepts and principles represented in the science museum exhibits, sometimes towards the accepted scientific understanding and sometimes in different and surprising ways. Therefore, my study included a post-visit activity, where students were asked to create group presentations to address specific inquiries they had during the visit. This was seen as providing the students an opportunity for articulating their thinking, but also for "making their thinking public and explicit" (Crook; cited in Wishart & Triggs, 2010, p. 676).

Drawing on previous research, through this activity I primarily intended to illuminate a way in which more complete elaborations of meaning could unfold. For example, in Leinhardt et al. (2002b) study visitors were asked to create diaries. The researchers' suggested that this type of activity has the advantage of reflection and selection of experiences, where presumably the diaries reported the most memorable aspects of the visit. In the *Gidder* project (Pierroux et al., 2011) students were asked to provide summative interpretations around artworks on a wiki. Both the *MyArtSpace* project (Vavoula et al., 2009) and the *MuseumScouts* project (Wishart & Triggs, 2010) involved students creating multimedia presentations either for sharing or teaching others respectively. Wishart & Triggs (2010) found that the production of multimedia presentations made it possible for students to check their understanding and enabled them to feel ownership of concepts. However, they also pointed to challenges teachers faced in supporting students with the processes of transforming and re-representing what had been learned in order to communicate with and teach others. As a result, the limited time teachers allowed for post-visit activities and the overall quality of the presentations produced were identified as issues.

4.4.7.1 Use of presentations in the study

Following the visit, in the classroom, students were asked to create a presentation to address their inquiry with the use of an online tool, Vuvox (www.vuvox.com)⁸. Being an online tool meant that Vuvox could provide access anytime, anywhere. It allowed the creation of scrolling visual presentations with hot-spots, i.e. video, music, pictures, text, and enabled uploading content within the museum.

⁸ The website was discontinued in September 2013.
K.Charitonos/2015

With this activity the aim was to examine how students were framing their understanding and how they were connecting this classroom activity to their visit experience. The presentations could assist the researcher in identifying which of the many possible ideas and themes encountered in the visit become appropriated by the students. Importantly, the attention would be on how the microblogging and the content created in the visit were helping the students to form these connections.

Students were working in groups and completed this work over two lessons. A third lesson was then required for each group to present this work to their classmates. In parallel to this activity, a peer-review activity was taking place where students could review other presentations by posting feedback on Twitter. This session was video recorded and transcribed. In total, seven presentations were created and data will be presented in Chapter 7 (Section 7.3.3).

4.5 ANALYTIC APPROACH

4.5.1 Background to the analysis

Analysis was attuned to the particular research questions and data collected. Having collected data from various sources and settings, a starting point for my analysis was to “build up a working understanding of the data” (Hammersley, 2012), in other words to create a set of ideas and resources of what I could do with my data. As noted already (e.g. with Twitter data, interview data) the initial stages of analysis, including organisation of data, reflection and interpretation (i.e. memos) were taking place concurrently with data collection.

Due to the amount of data collected during the project work, it was not feasible to transcribe it all. Therefore, I opted for transcribing the verbal interactions of the interviews and video data collected during the visit, whereas for classroom sessions, only those that were identified as useful for further analysis were transcribed. It is important to acknowledge here, as have other researchers that any written transcription “is an act of representation and in many ways a translation of verbal and physical activity into written form” (Twiner et al., 2013, p.10), i.e. it involves a variety of decisions and “it carries [one’s] own interpretation of what is important, and what information is necessary for the transcription to be understood by both ourselves and other readers” (Twiner et al., 2013, p.9).

Alongside the process of transcribing, I mapped all the tweets generated in the visit and the classroom sessions. I followed up on this data with an open-ended exploration of data, where ideas generated were not limited to the initial research motivations. During

this process of generating more ideas around the data, ‘phenomena of interest’ (Kleine Staarman; cited in Twiner, 2011, p.112) were identified, either verifying ideas set out beforehand or emerging through the process of analysis. This approach allowed me to be critical with my research questions and address concerns in the context of the data collected, but it also made me aware of some previously unanticipated patterns in the data (e.g. the ‘floating visit’, use of language on Twitter). I used the findings from this analysis to guide me in further detailed analysis to identify patterns, recurrent issues or unique points in the data that I could then explore further, e.g. with students’ presentations and meaning maps.

By attending to the research questions and in line with sociocultural perspectives underlying this work, more refined data analysis was carried out to enable the findings to be used to illustrate my arguments in presenting the data. A large part of the data was interview data, where I sought to develop conceptual categories that would provide me with the appropriate manner to describe and interpret students’ accounts. I discuss this process further in Section 4.5.2. Apart from interviews, video data and online interactions also constituted a large part of my data. I had a particular focus on students’ talk (face-to-face and online) in conjunction with encounters with artefacts and use of the microblogging technology. Therefore, in approaching the analysis of this data, I explored how meanings made were resourced in the talk among peers—also identified by Mercer (2004)—and in the use of other tools and artefacts (e.g. online posts, presentations). Hence, alongside language, other mediational tools were considered in the analysis (Mercer et al., 2009). It is important to emphasise that my purpose was to offer a detailed, contextualised view of how topic understanding could be resourced through the students’ approaches to activities, objects and tools used. The analysis of

online posts and video data are discussed in Section 4.5.3 and Section 4.5.4 respectively.

As my analysis progressed over time it became clear that modes (i.e. oral, visual, textual) were weaved together to convey complementary or different meanings, with technologies having a key role in this. Whereas, and similar to Twiner (2011), I recognised that talk had a central role in organising and interpreting the use of other tools, it seemed that the mode of image and the medium of screen (i.e. mobile phones, computers) had an impact on students' engagement with the museum objects and production of knowledge (e.g. taking pictures). As a result, my analysis also needed to accommodate this aspect and celebrate the potentialities of other modes to communicate and engage in social activity across different sites of social interaction. As Kress (2003) puts it:

Language alone cannot give us access to the meanings of the multimodally constituted messages; language... now ha[s] to be seen as [a] partial bearer... of meaning only. (p.35)

In response to this, I adopted a multimodal 'gaze' to consider the range of modes that the participants used in a communication event (e.g. in front of an object) and to examine how meanings were made, distributed and interpreted through a range of representational and communicational resources available to them (Jewitt, 2010). By adopting this gaze, I further, acknowledge that the forms, processes and contents of communication are socially shaped and embedded in social environments and practices. Therefore, my analytic approach was looking at the use of resources to produce communicative artefacts and to interpret them in the context of specific social situations

and practice. In approaching the data collected in the museum, a documentation of each group's visit was carried out as a series of events based on the objects-in-focus and interpretive resources provided by the museum, alongside data generated by the students. Diagrams of the routes that the groups followed and transcripts that were drawing on multiple sources of data were created for each group. Importantly, I was looking for signs which show 'connection building' (Littleton & Kerawalla, 2012, p.32), with a particular focus on examining whether artefacts/objects and tools encountered or used during the activities inform students' presentations and posts online and assist them in making connections across the settings (RQ2). The approach I took in analysing personal meaning maps and students' presentations are discussed in Section 4.5.5 and Section 4.5.6 respectively.

Furthermore, in analysing data and tracking students' trails in the museum, I became more aware of the variety of experiences students had in the visit. Hence, my analysis needed to deal with this aspect and offer an account of the activities that the students engaged with and the tools they used in the museum and the classroom, with a particular focus on how these had shaped their visit experience and how their understanding developed over time. Since a key concern in the thesis was 'time', the analysis chapters (Chapter 5, Chapter 6 and Chapter 7) follow a temporal structure, i.e. prior to the visit, in visit and after the visit, to show the cumulative character of learning and attribute the importance of 'temporal unfolding' of meanings. The data collection methods have been discussed in Section 4.4. The different methods of analysis described below focus on different aspects of the data, but essentially the process of working within each method and what was found informed—and were informed by—other methods to offer an accurate interpretation of the data as a whole. In this research

a systematic approach to data capture and analysis was taken to ensure a clear ‘audit trail’ between the data and the conclusions that were distilled.

4.5.2 Analysis of the interviews

Interview data was first transcribed. It was then transformed into workable units by using techniques such as coding and preparing displays of commonly coded data segments. Miles and Huberman (1991) refer to these as key data reductive techniques for transforming data into workable units. Each student was examined as a case in its own right before cross case analysis was undertaken (this is not applicable for the teacher).

Cross case analysis helped me to go beyond initial impressions and contributed to accurate and reliable findings, which were a close fit with the data. The ‘within’ as well as ‘cross case’ analysis of empirical evidence was carried out by using various analytical techniques like pattern matching (Yin, 1994) and creating analytical tables (Miles & Huberman, 1991). In this analysis, a strategy of pattern coding was used to identify the students’ views around the visit and the use of technology in the museum and in the classroom as well as practices involved in the use of technology in these settings—based on the students’ accounts.

In analysing the transcripts, first level coding was used to summarise segments of data (e.g. ‘museum experience’, ‘artefacts’, ‘past visits’, ‘learning’, ‘participation’), while pattern coding was carried out by grouping those codes into a smaller number of overarching themes or constructs (e.g. ‘inter-connectedness’, ‘attitudes’, ‘prior experiences’, ‘perceptions’, ‘expectations’). Miles and Huberman (1991) suggest that

pattern codes are explanatory codes, ones that identify an emergent theme, pattern or explanation that the data suggests to the researcher. Their role is to pull a lot of material together into more meaningful and parsimonious units of analysis. Alongside this, the theoretical framework provided broad categories for data classification and various pattern codes were classified under these broad categories (e.g. ‘context’, ‘affordances’, ‘tools’, ‘resources’).

The purpose was to report prevalence of patterns across the entire data set, depending on the number of students who articulated the theme. However, particular attention was also given to identify and explain cases that contradicted prevalent themes, especially if something important in relation to the research questions was captured (e.g. ‘trust’, ‘distraction’). Rare themes are no less meaningful, useful, or important than common ones. In fact, a researcher, alongside points of convergence in the data, should also try to identify points of divergence and not to suggest that all the data provides an ‘agreed’ view of the described events. Interview data from the students and the teacher is presented in Chapter 7.

4.5.3 Analysis of the tweets

For the analysis of the online discourse on Twitter an interpretation of the visit through a descriptive numerical analysis of the micro-posts was provided. This was followed by a representation of the online discourse and an analysis of the functions tweets have in the development of the students’ understanding.

Regarding the former, and drawing on few categories suggested by Elavksy et al.

(2011), the tweets posted during the classroom lessons and the museum were input into

an Excel spreadsheet and classified into nine broad categories, based on features of the micro-post and its content, e.g. type of the tweet, task, hashtag, hyperlink to photos.

Following on this, I drew on an approach suggested by De Liddo et al. (2011) to structure and represent the discourse as a semantic network of posts. According to the researchers, each post is coded according to its function in the conversation and is connected to a specific post or participant, according to the function of the post and its place in the conversation. In my analysis, the representations created had a focus on mapping the tweets as a network of posts, and presenting the connections among the students. For this process Compendium was used (<http://compendium.open.ac.uk/>)⁹.

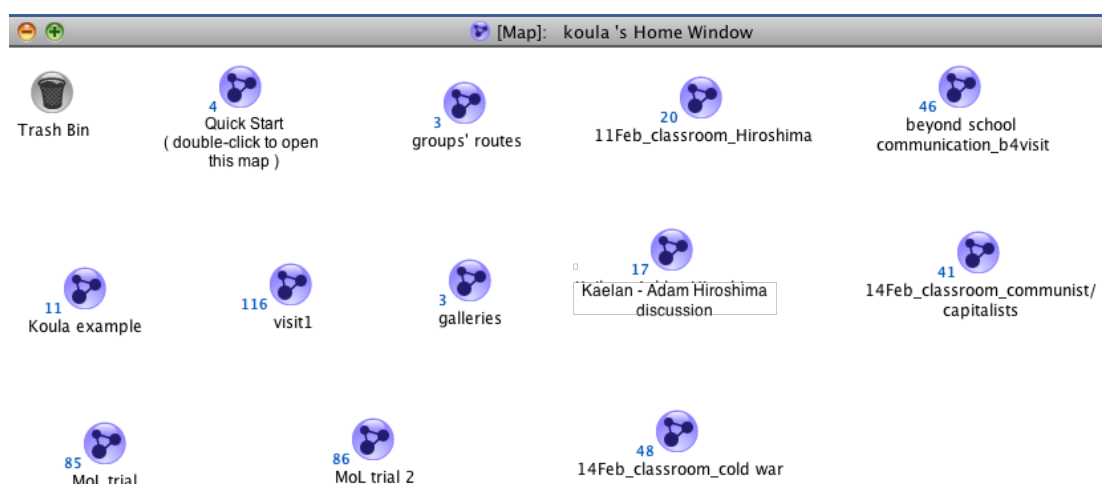


Figure 4.4 Screenshot of maps created for the analysis of the tweets

Compendium is a software tool for mapping information, ideas and arguments. It supports the creation of a range of visual mapping techniques (e.g. mind maps), which offered the potential for a range of flexible approaches to the analysis of the tweets.

Various types of electronic files could be incorporated into the map, such as the museum's map, photos of objects and photos generated on iPhones. It also included the

⁹ Last accessed 1 March 2015.
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option to link directly to external Websites (i.e. when hyperlinks were included in a tweet). The maps created on Compendium could be exported in a variety of ways (e.g. jpeg files). In addition to this, for each post, connections to other maps where a user appears could be created and specific information could be assigned, e.g. name of student, date the tweet was posted, total number of tweets a user had at the time of the particular analysis. Also each post could be coded (tagged) according to its label (tweet) (e.g. tags assigned: argument, affective, on task). Fig. 4.4 shows a screenshot of a number of maps created on the Compendium during the initial stages of the analysis. It is noted that the maps created on the Compendium included many levels of information. Although this was useful in the initial stages of the analysis, simpler representations that were drawn in Microsoft Word are used in the thesis (see Fig. 4.5). Further to this, to gain familiarity with the Twitter data and identify patterns, various types of maps were created (see Fig. 4.4, 'group routes').

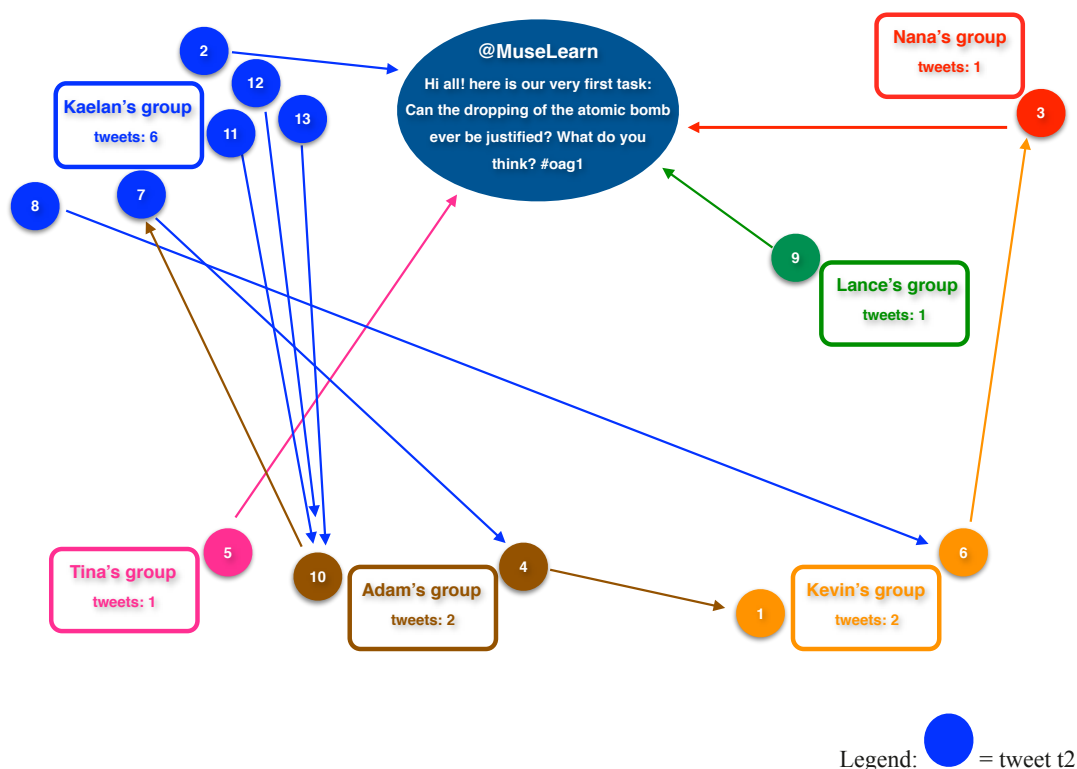


Figure 4.5 Example of a map created for a classroom lesson

An example of a map is provided in Fig. 4.5 and represents the tweets posted in the classroom during the lesson ‘Hiroshima Bombing’. The groups/users are represented by rectangular shapes in various colours, while the tweets are represented by small circles, clustered around the users who posted them. The sequence of the tweets in the Twitter stream is shown by a number in each circle. For example, circle 1 in Kevin’s group is the first tweet (t1) and circle 13 in Kaelan’s group is the last tweet (t13). The arrows link a tweet which is addressing or is a direct response to another tweet (e.g. in reply to). In all the arrows, the line origins from the tweet/user who posts the tweet, with the arrow pointing to the tweet/user that is addressed. For example, tweet t5 in Tina’s group is a direct reply to the initial question posed by MuseLearn. Similar representations are used in Chapter 5 and Chapter 6.

Table 4.1 Characteristics: Function of the tweets

Code	Characteristics	Description
RES	Responsive	on task (<i>according to their inquiry, worksheet</i>)
InT	Interpretive	providing an idea, opinion or description (<i>it might characterise the tweet as a whole</i>)
INF	Informative	providing information (<i>e.g. dates, names</i>) <ul style="list-style-type: none"> • <i>thematic (related to the theme of the visit)</i> • <i>general information</i>
EVA	Evaluative	evaluating opinion, comment, action, picture
INT	Interrogative	asking questions
JUD	Judgmental	expressing agreement or disagreement
ARG	Argumentative	justifying information, opinions or actions, giving reasons
ILL	Illustrative	giving examples (<i>incl. picture posted online</i>)
EXP	Experiential	expressing personal experiences (<i>e.g. looking, touching</i>)
AFF	Affective	expressing feelings
REF	Reflective	providing a reflection on ideas, actions or the experience, being thoughtful

The last step in the analysis of the micro-posts was the analysis of the content. This was carried out to identify the precise role of the tweets in the wider online discourse. All the tweets were coded according to eleven characteristics that emerged from the data. The codes were not mutually exclusive. The categories suggested by Silverman (1999) and Allen (2002) were used as a framing tool (see Section 2.2.2.2). Table 4.1 presents these characteristics, while a table illustrating the process with specific examples is provided in the Appendix B (Table B5). The data collected from Twitter is presented in Chapter 5, Chapter 6 and Chapter 7.

4.5.4 Analysis of the video data

4.5.4.1 Analysis of the video data collected in the museum

For the analysis of the video data collected in the museum, an adapted version of Ash's (2007) approach of video analysis is employed. Ash (2002; 2007) examines and analyses dialogic interactions at life science exhibits and offers theoretically-grounded tools to study scientific meaning-making over time. Although much of this work focuses on interactions among family members and centres on biological content, her approach of video analysis provides an appropriate framework to follow a group of students while exploring the museum galleries and examine meanings made in their conduct with artefacts, tools and each other.

Ash (2007) identifies three levels of analysis. The first level is called the 'flow chart'. The flow chart provides an overview of an entire visit, from which particular segments can be identified and analysed in more detail. The second level is intermediate and Ash calls it a 'significant event' (SE). The SE takes one segment of the flow chart and

analyses it in greater detail, emphasising dialogue, content and the kinds of tools the groups use both to make sense of the science and to connect it to their own prior understanding. The third level is microgenetic and comprises a detailed dialogic analysis. This level involves analysing specific SEs in greater detail, and might include dialogue, gesture, gaze and actions. In the following paragraphs the three levels of analysis are explained in more detail by providing specific examples of extracts of video data captured during the visit.

In all three levels of analysis, I read the transcript in conjunction with watching the video several times, with a view to identifying and analysing events during which evidence pointed to the students being engaged in interpretive situations. By maintaining a clear contextual perspective for the data, the focus was on examining how the students approached these situations by employing a range of tools and resources.

To preview the video and identify particular segments, the tool ELAN (<http://tla.mpi.nl/tools/tla-tools/elan/>)¹⁰ was employed, where particular events were marked.

1. Flow Chart

Flow Chart I provides an overall picture of the visit, where the major events are identified and presented in each row. ‘Events’ are based on encounters students had with objects and sustained conversational segments around them, i.e. interpretive situations. Table 4.2 below isolates two events. In each event, the main aim was to provide a broad context of the interaction by identifying location, the person who leads (if possible), group formation and some content themes deducted from the interactions. Similar

¹⁰ Last accessed 1 March 2015.
K.Charitonos/2015

records have been created for all the events identified and can be seen in Appendix B (Table B6).

Flow Chart I offers an overview of the visit. Before moving to the second level of analysis suggested by Ash, I decided to construct Flow Chart II where a number of ‘Promising Events’ were to be identified. For this process a set of criteria were set: the visit’s theme, tools/resources used, development of content, acknowledgment of the environment (physical and social), drawing on prior knowledge, any conflicts that arose and how or whether these were resolved. Table 4.3 shows one ‘Promising Event’ identified through this process.

Table 4.2 Example from Flow Chart I

Flow Chart I: People’s City Gallery		Group 3: Kevin (K), Heather (H) and Adele (A)	
Time	Exhibit	Context	Themes
01:54-02:40	Colonial Exhibition	Group together. Looking closely. K. leads with a question; A. responds; K. challenges, H. new question. K. responds	Questioning Pointing to the display Reading label
17:20-19:38	Selfridges Lift/Cinema	only K. and A., H. joins later K. leads: “Q. What did you think about it?” K. prompts to pick up a picture and tweet about it. A. hesitates	Navigation Tweet - ‘wow factor’ Social environment

Table 4.3 Example from Flow Chart II

Flow Chart II: People’s City Gallery				Group 3: Kevin (K), Heather (H) and Adele (A)	
Time	Exhibit	Topics	Tools/ resources	Contextual Notes	SE
17:20-19:38	Selfridges Lift/Cinema	location navigation dates tweet	Worksheet iPhone Twitter photos	Initially only K. and A., H. joins later. K. looks at the worksheet to check and confirm name of gallery. K. initiates discussion about what to tweet and prompts A. to use a nice picture. A. looks unsure. H. gets the iPhone from K. Group meets F. (Group 1). A. asks three questions about completion of task/tweet. H. & K. talk about dates. K. looks at the worksheet and heads to a different section. H. & A. follow him. Tweet posted.	√

As shown in Table 4.3, Flow Chart II keeps the basic form of the flow chart suggested by Ash (2007), but is also adapted to the thesis' RQs, since the column 'Tools/Resources' is added. Also, more detailed contextual notes were added for each event, with a focus on how the students approach and make sense of an exhibit, what practices they follow, what guides them in their exploration around the galleries and how they use tools and resources available to them. Similar records have been created for all the events and can be seen in Appendix B (Table B7). The promising events in Flow Chart II are marked in bold. The next step in the analysis was to isolate significant events (SEs) at the intermediate level of analysis.

2. Significant Events

The next step was to look for more detail over small units of time, select some representative events and then fit these Significant Events (SEs) into the larger frame of the entire visit. This was seen as an advantage regarding Ash's approach, since it is neither top down nor bottom up, rather one should work from both ends towards the middle. For Ash (2007) each SE arises from other events and subsequently affects future outcomes. SE is large enough to encompass one meaning making event and contains: (1) recognisable beginnings and endings, generally but not always centred on one particular exhibit; (2) sustained conversational segments that differ from the short, unsustained interactions that can precede and follow SEs; (3) different sources of knowledge, such as distributed expertise; and (4) inquiry strategies, such as questioning, inferring, or predicting.

Drawing on Ash's criteria above, and in line with the RQs, in order to select a SE the following set of criteria were set (not necessarily all in one event): (1) sustained

conversational segments, with recognisable beginnings and endings; (2) the theme of the visit (i.e. civil rights) and types of activity, e.g. collect evidence, communicate to an audience; (3) individual/collective components of an activity and types of participation; (4) engagement with particular resources/tools, i.e. Twitter, mobile phone, worksheet; and (5) change in practices over time (if observed).

Table 4.4 Codes and characteristics of video data collected in the museum

Categories	Codes	Characteristics	Description
Artefact related	EMO	emotions	value judgments, expressing surprise, joy, frustration
	INT	Interpretation	providing an interpretation (e.g. incl. feature description)
	NAM	naming	attempt to name an object or identify what it is
	PR	prior knowledge	draw on prior knowledge
	PERS	personal experience	associations with personal experiences
	QUE	question	asking questions about artefacts
Participation-related	TAS	task	deciding/executing a task (theme of the visit or self-assigned)
	COL	collaborative	executing an action/task collaboratively
	CON	conflict	disagreement; breakdown; issues within the group (e.g. group splits)
	COR	coordination	a member coordinates actions
	IND	individual	working individually
	RESV	resolve	resolve a conflict
Environment-related	RES	resources	draw on resources, e.g. label, phone, tweets
	SOC	social	acknowledge of social context (e.g. meet other students/visitors)
	PHY	physical	references to physical environment (e.g. refer to things around them, references to navigating around)

As a result, five SEs were selected from Flow Chart II (e.g. see the event in Table 4.3) as a representative selection of all the events taken place during the visit. Each of the SEs was divided into smaller segments and in each segment codes and detailed contextual notes were assigned. Categories, codes and their description are presented in

Table 4.4. For an example of how segmentation was applied in the SEs see Appendix B (Table B8).


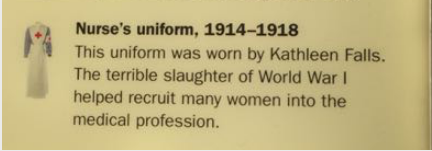
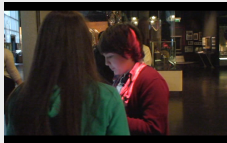


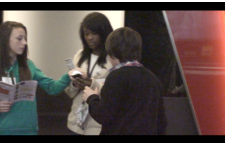

In what follows the ‘microgenetic level of analysis’ proposed by Ash (2007) is introduced.

3. Microgenetic level of analysis

Using the SE as a frame, Ash (2007) suggests that one can then focus on a fine-grained dialogic analysis of carefully selected segments of talk and gestural activities. Ash has developed several tools to undertake this type of analysis: (1) the first tool provides a simple framework for identifying the utterances within a SE, and then pairs the utterances with the actual function they serve within the SE; and (2) the second tool uses a discourse analysis frame adapted by Wells (1999), which identifies the range of possible follow-up responses afforded by a particular utterance. The follow up functions can include expansion on a given response, justification, exemplification, explanation or reformulation. Such discourse moves can expand the range of possible responses rather than containing them. They can also serve as strategies for sustaining conversation beyond the simple Initiation-Response-Follow up (IRF) structure (Ash, 2002).

In line with a framework that allows a researcher to focus on talk-in-context and consider other mediational tools in the analysis (Mercer et al., 2009) as well as adopting a ‘multimodal lens’, the three levels of analysis proposed by Ash were combined with other resources (e.g. photographs, tweets, video stills) to create multimodal transcripts. In the analysis of the SEs, in particular, the first tool suggested by Ash in the ‘microgenetic level of analysis’ was employed. This tool was seen as providing a

Table 4.5 Example of a transcript: the analysis of a Significant Event (Ash, 2007)

Events	Flow Chart 1: First tweet			
Object-in-focus	 <p>©Museum of London</p>			
Name	Nurse's Uniform			
Description /Label (by MoL)	 <p>Nurse's uniform, 1914–1918 This uniform was worn by Kathleen Falls. The terrible slaughter of World War I helped recruit many women into the medical profession.</p>			
Video Stills	 A. 17:24	 B. 17:52	 C. 19:13	 D. 19:18
Photos on iPhone				
Verbal Interaction	<p>K. Alright, tweet some photos. Alright, pick a photo that you think it was quite good from going around there...</p> <p>→ <u>K. introduces a task and frames how to execute it.</u></p> <p>(A. starts walking, K. follows and both join H. All stand by the cinema)</p> <p>→ <u>A. hesitates</u></p> <p>K: Heather, pick a photo in here that you think it was quite good from going around that one and just say 'WOW, look at this thing which is over there'</p> <p>→ <u>K. reassigns the task. Adds a script.</u></p>	<p>H: Do that? (H gets the iPhone from A. and starts typing - see Still B)</p> <p>→ <u>H. puts herself forward and resolves the tension.</u></p> <p>K. Yeah...do that and then just say like 'Wow, look at...'</p> <p>→ <u>K. approves and repeats instructions</u></p> <p>H: Look at the (...) (laughs)</p> <p>K: (laughs) Say '20s</p> <p>→ <u>Both respond to H's joke with laughter. K. refers to content.</u></p>	<p>A: Is this done? Is it done? → <u>A. inquires</u></p> <p>H: Yeah...Used to... → <u>H. responds affirmatively</u></p> <p>K. That's People's City and the next place we need to go to is... (K. looks at the worksheet) ...Expanding City.</p> <p>K: Ok, the next one is down there (K. points to the direction - see Still C)</p> <p>→ <u>K. gives orientation cues for next task</u></p>	<p>K: So, have you done it? (talks to H.)</p> <p>→ <u>K. seeks for confirmation that task is executed</u></p> <p>H. Yeah... (A. gets iPhone back - see Still D)</p> <p>→ <u>H. responds affirmatively</u></p> <p>K. Then tweet it!</p> <p>H. I tweeted...</p> <p>A: Adele K: Kevin H: Heather</p>
Tweets	t41: Woke [Wow] look at what the nurses used to wear around the 1930's			

detailed account of how the interaction/dialogue unfolded and offering useful insights on content, practices followed and other contextual details (see underlined in Table 4.5). The transcript in Table 4.5 shows the analysis of the SE event described earlier in Table 4.3 and Table 4.4 (also in Appendix B, Table B6, B7). Similar transcripts are presented in Chapter 6.

4.5.4.2 Analysis of the video data collected in classroom and the bus

The first step in the analysis was to transcribe the video data collected in the classroom. It was decided to transcribe the verbal interactions of this data, but only those that were identified as useful for further analysis, i.e. interactions while completing the personal meaning maps, the students' presentations. Extracts from such interactions are presented throughout the analysis chapters and complement the analysis of other data (e.g. personal meaning maps).

Regarding the video data generated by the students on the bus, all were transcribed and a content analysis was performed. Responses per theme were quantified to make their relationship to the wider population apparent. In addition to this, some verbatim quotes to illustrate the themes are also displayed. This analysis is presented in Chapter 6 (Section 6.2.6).

Transcripts were created in conjunction with watching the video data several times. To preview the video and identify particular segments, the tool ELAN was employed (<http://tla.mpi.nl/tools/tla-tools/elan/>)¹¹. For a list of symbols used in the transcription see Appendix B (Table B3).

¹¹ Last accessed 1 March 2015.
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4.5.5 Analysis of the questionnaires

To analyse the questionnaire data, the first step was to add codes to each respondent's closed questions. This data was entered into an Excel spreadsheet. Following this, for each of the items in Likert scales, the frequencies were calculated. Non-parametric procedures were further considered appropriate for analysing the data. These procedures were based on the median or the range and were relying on the ordinal nature of the Likert scale data included in the questionnaires, in which values were ranked relatively to each other but were not measured absolutely.

As a result, the median and Inter-Quartile Range (IQR) were calculated: (1) the median is the number found exactly in the middle of the distribution and is a measure of central tendency and shows the 'likeliest' response; (2) the IQR is a measure of dispersion and shows whether the responses are clustered together or scattered across the range of possible responses. Larger IQRs might suggest that opinion is polarised, meaning that respondents tend to hold strong opinions either for or against this topic. The calculations were computed by using the software MiniTab (<http://www.minitab.com>)¹².

For each of the open-ended questions a content analysis was performed. Codes were assigned to describe the thematic content of the comments. Responses per theme were quantified to make their relationship to the wider population apparent. In reporting this data the numbers of respondents making each comment are displayed. In addition to this, some verbatim quotes to illustrate the themes are also displayed. The questionnaire data are presented in Chapter 5 and Chapter 7.

¹² Last accessed 1 March 2015.
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4.5.6 Analysis of Personal Meaning Maps

The personal meaning maps were analysed both quantitatively and qualitatively. To assess the impact of the visit, students' written responses in the PMMs were initially analysed along four semi-independent dimensions proposed by Falk et al. (1998): (1) extent, i.e. examines a learner's use of vocabulary; (2) breadth, i.e. categorises the concepts used by a learner to make a comparison between the learner's pre- and post-visit learning; (3) depth, i.e. measures a learner's understanding of the concepts used; and (4) mastery, i.e. assesses the overall quality of the understanding and how a learner makes use of it.

To determine and refine the categories used in the first two dimensions, another rater, apart from the researcher, checked off which category the students' written responses fell in. To calculate the percent of agreement between the two raters, corrected for chance, Cohen's (1960) kappa coefficient (κ) was calculated.

Apart from the descriptive statistical data calculated for each of the dimensions, a detailed descriptive interpretation of the interviewees' meaning maps was also conducted. A question related to the PMM was posed to eight interviewees (N=8): "Can you guide me through your meaning map?". The availability of the verbal description collected in response to this question provided the basis for this analysis, which consists of descriptions and interpretations of the meanings students made from the visit. Various sources of data (e.g. terms used in the PMMs, tweets posted) were employed concurrently in the analysis, and the analytic intention was to note any connections made between terms on PMM and interactions in the visit/classroom, objects or posts online.

A detailed description of how this analysis was conducted is provided in Chapter 7 (Section 7.3.1).

4.5.7 Analysis of worksheets

In the analysis of the worksheets all the answers provided by the students were recorded in an Excel spreadsheet. Then each tweet posted during the visit was examined to see whether it consisted a response to a worksheet task. The data collected from this instrument is included in Chapter 6 (Section 6.2.1) and complements other sources of data (e.g. video).

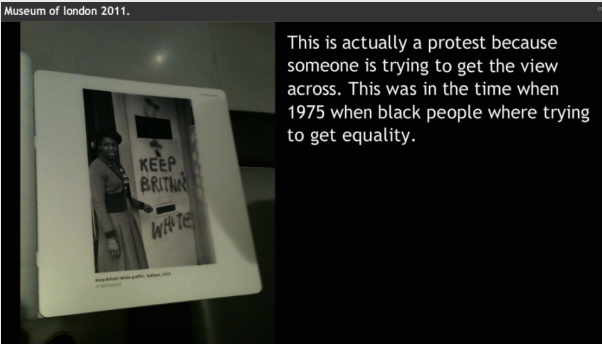

4.5.8 Analysis of the students' presentations

The analysis of the students' presentations focused on how students resourced their collage (i.e. multimedia presentation) and whether there is evidence to show 'connection building', the meanings made across the settings and the role of the technologies in mediating this.

To carry out the analysis a multimodal transcript for each presentation was created. As in the example provided in Table 4.6 below, the first row of the transcript shows the collage, the second row shows the text included in each of the frames (i.e. Textual Mode) and the third row shows the transcript of the verbal presentation - if available (i.e. Oral mode). Further to this, the rows in the bottom of the table identify resources (i.e. tweets, photos, verbal interactions, notes) that students drew on to create their presentation. In the example in Table 4.6, the analysis pointed to two signs for connection building, that is a tweet and a photo generated in the museum. This transcript allowed visibility of the resources the students employed in creating this

presentation. Similar transcripts were created for all groups (n=7) and the analysis is presented in Chapter 7 (Section 7.3.3).

Table 4.6 Example of a transcript: the analysis of a Group Presentation

Collage/Frame B	
Visual/Textual Mode	
Textual Mode	This is actually a protest because someone is trying to get the view across. This was in the time when 1975 when black people where trying to get equality.
Oral Mode	(the key of bringing the white) poster, it's sort of – it's still...protesting, it's not physical like - it's a peaceful method, it's not the best type of method for some people, but people still, they are still protesting because someone doesn't agree with what people are saying, doesn't what to do what people, other people say and trying to get their view across, well in 1975 where black people are trying to get (vote).
Resources	
Photos from 'Picture Pool'/online	 Graffiti, Balham
Tweets by Group 4	t64: #muvi3 the protest with the 'keep Britain White' this is a protest not a good one but someone is still trying to say something

4.6 ETHICS

In Chapter 2 (Section 2.1.5) ethical issues around the use of social and mobile technologies with young people were discussed. To ensure that the participants of this project (and their guardians) were fully informed, but also in order to adhere to the requirements of the Open University's Human Participants and Ethics Committee, a set of documents were sent to the participants and their parents prior to the project start.

This set of documents included: (1) an information sheet with details of the research project, its purpose and the derivable benefits to the education community; (2) a letter to the parents combined with a consent form; (3) a consent form for the participants; and (4) a withdrawal form for the participants. The documents are available in the Appendix D.

The consent forms were designed to obtain permission from the participants and their parents for the use of their personal data for the purpose of this research in accordance with the Data Protection Act. It is noted that in the thesis the real names of the participants are replaced by pseudonyms. The consent forms also asked for the participants and their parents' permission for publishing this work in journals and conferences. It ensured full confidentiality and reassured them that the data would be kept secured and used for the purposes of this research only. The data collected was protected under the Open University regulations. The procedure followed was also adhered to the *British Educational Research Association's* (BERA) guidelines.

In addition to obtaining permission from the participants and their parents, permissions were also obtained by the Head of the Learning department at the Museum of London and the Headteacher of the secondary school.

Finally, due to the nature of the research project, prior to the study the researcher and the teacher facilitated a session with the participants where safety issues on the Internet were discussed (see Appendix C, E-safety brochure).

4.7 SUMMARY

This chapter documents how a combination of data collection methods were used within a case study methodology to offer insights on the use of microblogging across formal and semi-formal settings over time. An educational intervention was designed and a descriptive and interpretive case study was conducted to address the RQs in the thesis.

This research design allowed the researcher to describe and interpret what occurred in the specific settings and to follow the participants across the learning settings. It also allowed her to combine various research techniques to gather insights and reflections from the participants. Finally, this design allowed the researcher to address various units of analysis, e.g. individual/group.

To conclude, Chapter 4 provided a detailed overview of the process of working within each method and how this has allowed a reliable and accurate interpretation of the data as a whole. In this process the aim was to identify points of convergence and divergence in interpretation and perspectives and not to suggest that all the data should provide an ‘agreed’ view of the described events. A systematic approach to data collection and analysis was taken to ensure a clear ‘audit trail’ between the data and the findings that were distilled.

The first phase of the data collection took place in the school. This is the focus of the next chapter. Chapter 5 sets the profile of the participants of the study and presents data that helps answer the question about whether the use of microblogging mediates the connections between classroom and museum activities before the visit (RQ2).

CHAPTER 5

SETTING THE STAGE FOR THE VISIT EXPERIENCE

Chapter 5 focuses on pre-visit lessons that set the stage for the museum visit and were used principally to prime the students for the museum experience. This chapter presents a number of classroom activities, which combine and align the learning undertaken in face-to-face sessions with learning opportunities created online. Chapter 5 further outlines the profile of the participants of the study.

Data presented in this chapter comprises face-to-face and technology-mediated interactions, video data and questionnaire data, as well as observation notes. This chapter contributes evidence to help answer the question about whether the use of microblogging mediates the connections between classroom and museum activities before the visit (RQ2). Particular emphasis is put on the technology's potential in enabling communication and sharing of knowledge. The perceived benefits and barriers in using microblogging within a classroom context are also discussed.

The chapter is organised as follows: the first section (Section 5.1) outlines the main objectives of the pre-visit lessons. Following, in Section 5.2, the data collected from the pre-visit questionnaire is examined in order to set the participant's profile. This section will present their use of Social Network Sites (SNSs) as well as their views on museums. In Section 5.3 and Section 5.4 the four pre-visit lessons are described and analysed

respectively. Particular emphasis is put on the three lessons which involved blending face-to-face with online communication. The fourth lesson, which kept the format of a traditional lesson and provided an introduction to the topic of ‘Civil Rights’, is also examined. The findings from this analysis are discussed in Section 5.5 and finally, a summary of the key points raised in Chapter 5 is provided in Section 5.6.

5.1 AIMS AND OBJECTIVES OF PRE-VISIT LESSONS

A main aim of the pre-visit lessons was to examine the use of Twitter as a communication and pedagogical tool in a classroom setting and at the same time to introduce students to new forms of communication with a museum via different channels, e.g. You Tube (<https://www.youtube.com/>)¹³, the museum’s Website (<http://www.museumoflondon.org.uk/>) and Twitter. An objective of the pre-visit lessons was to introduce the technological tools to the participants, who could then explore Twitter’s basic features, i.e. reply, followers, hashtag. It was expected that over the course of the four lessons they would gradually gain familiarity with these tools. A brief introduction to the ‘Equality and Beliefs’ Scheme of Work was planned, while another activity supported skills of observation and interpretation of objects. The last objective was to gain some insights about the participants. In essence, this involved their familiarity with the Internet and SNSs as well as the environment in which the study would take place to inform the research design.

It was anticipated that familiarisation with the tools and development of interpretation skills would facilitate project work. Therefore it was decided to introduce the tools in a session where the topic had been previously taught (Lesson 1: Hiroshima Bombing) and then, integrate them in a session that would largely keep the format of a ‘traditional’ lesson

¹³ Last accessed 1 April 2015.
K.Charitonos/2015

(Lesson 2: Cold War). It was expected that the participants would gradually gain competence in using these tools in new communication situations, such as the communication with a museum curator (Lesson 3).

5.2 PROFILE OF THE PARTICIPANTS

The pre-visit Questionnaire (QI) was distributed to students before the visit. The questions focused on understanding the participants' use of the Internet and SNSs and their views on museums. In total, twenty-two QIs were collected. This method was discussed in detail in Chapter 4 (Section 4.4.4). The pre-visit Questionnaire can be found in the Appendix A.

5.2.1 Pre-visit Questionnaire: Use of Social Network Sites and views on museums

This section summarises the findings of the analysis of the QI. Key aspects identified as contributing to the interpretation of the main findings from this study are highlighted and discussed.

5.2.1.1 Participants

The questionnaire data suggests that participants had extensive access to technology (see Table 5.1). It shows that more than half had their own computer, all had their own mobile phones and all except one had game consoles. Regarding their Internet use (see Appendix A, QI/Questions B1-B2), the analysis showed that the majority appeared to be going online frequently, with half the students (n=11) opting for 'several times a day', and approximately a third of them (n=7) 'once a day'. Apart from that, all the students used the Internet regularly, with most students reporting they were spending either '21-40 hours per week' (n=6) or '10-20 hours per week' (n=7). To access the Internet almost all (n=21) reported using a gaming device (e.g. Xbox, P-S-P), more than half (n=12) were using their

mobile phone (n=12) or an iPod/mp3 player (n=11), but rarely an e-book (n=1) or a tablet (e.g. iPad) (n=1).

Table 5.1 Students' access to technology (Q1/Question A1) (N=22)

Different types of technology	Access
Access to computer	22
Possess own laptop/PC	13
Mobile phones	22
Game console	21
Ipod/mp3 player	19
Internet connection	21

Students were also asked to reflect on how comfortable they feel using the Internet (B3). Almost all the responses ranged between 'very comfortable' (n=14) and 'quite comfortable' (n=5). Notably, none declared themselves to be 'uncomfortable' when using the Internet. Among the activities students undertake online (B5), the most popular were playing games (Item 1), listening to music (Item 3) and sending/receiving games (Item 4). Activities occurring less often seemed to be the ones with a 'creative' aspect in them, e.g. 'creating/working on an online journal or blog' (Item 10) and 'creating a web page' (Item 11) (see Table 5.2).

A few of the items in this question (B5) were identified as particularly related to the study (see Item 9, Item 13, Item 16 in Table 5.2). However, they were not among the popular activities practiced by students. Having said this, more than half the respondents (n=12) reported to have used Twitter/another service to share updates about one's self or see updates about others sharing content online (i.e. photos, stories, videos). Many (n=9)

posted comments to a website, blog, news site or photo site, while half (n=11) shared something they created (e.g. a video, photo, story).

Table 5.2 Students' online activities (QI/Question B5) (N=22)

Online activities		No of participants
1	Play games	21
2	Chat with friends	19
3	Listen to music	20
4	Sending/receiving emails	21
5	Finding information	19
6	Browse (without specific purpose)	16
7	Watch video clips	19
8	Use a social networking sites	18
9	Share something online that I created myself, such as my own artwork, photos, stories or videos	11
10	Create or work on an online journal or blog	2
11	Create web page	3
12	Read an online newspaper	2
13	Post comments to an online news group, website, blog or photo site	9
14	Find/read resources for one of my lessons at school	17
15	Visit Virtual Worlds like Second Life	5
16	Use Twitter or another service to share updates about yourself or to see updates about others	12
17	Take material I find online — like songs, text or images —and remix it into my own artistic creation	6

5.2.1.2 Use of Social Network Sites

Part C of QI addressed issues of the participants' use of SNSs. Most created an online profile (n=19) (C1), and more than half (n=12) created a profile on more than one SNSs (C3).

Part C also included three open-ended questions focused on identifying the main sites used by students, the purpose and the perceived value of using them. Regarding the former (C4), the main social media platform students had a profile on was Facebook (n= 17), followed by MSN Windows Live (n=10) and Twitter (n=7). Three students (n=3) did not give an answer to this question. Overall, students seemed to be frequent users of SNSs. Most were visiting them either ‘several times a day’ (n=8) or ‘once a day’ (n=7). Popular ways of using SNSs to communicate within one’s social network involved (C6): ‘staying in touch with friends’ (n=17); ‘make plans with friends’ (n=14); and ‘send private messages’ (n=16) or ‘post public messages to a friend’s page’ (n=16). Preference for these activities was also verified by the responses in the open-ended questions that will be summarised below.

The second open-ended question in Part C (C7) investigated students’ motivations for using SNSs. ‘Communication with friends or family’ (n=14), mainly viewed as means to enhance and ‘maintain friendship or family ties’ (n=12), emerged as a key motivation for the participants to use SNSs. Related to this point is this idea of SNSs helping their users to reach out to people and ‘extend their social network’ (n=4). Table 5.3 shows a few exemplar responses that demonstrate these motivations.

This question further revealed that the most popular activity on SNSs was ‘talking/ chatting’ (n=9), while other activities mentioned were ‘looking/posting/getting photos’ (n=3), ‘watching videos’ (n=1) and ‘seeing comments’ (n=1).

The third open-ended question in Part C (C8) investigated the perceived value of SNSs. All except two students responded positively (n=17). The findings showed a similar pattern to the findings of the previous question (in Table 5.3). ‘Communication with friends and

family’ (n=11) was seen as the main value, while SNSs enabled them (n=11) to stay connected and ‘maintain friendship and family ties’. For a few students (n=3) the value lies in ‘skills development’ (e.g. ICT skills, social skills). Importantly, very few students (n=2) seemed to associate SNSs with learning.

Table 5.3 Reasons for using Social Network Sites (Q1/Question C7) (N=22*)

Reasons for using social networking sites	No of participants	Exemplar Quotes by participants
Communication with friends and family	14	“it helps me be in touch with all of my friends and helps me communicate with people” (Nana)
Maintaining family and friendship ties	12	“let you communicate with people who have moved away or you don’t see often” (Jack)
Perspective and Awareness within one’s network	4	“keep up-to-date with things happening around the world and with your friends” (Kevin)
Extend one’s network	5	“...make new friends” (Lance)
User experience e.g. fun, easy	5	“Because it’s a free way to talk to your friends. And look at photos, see comments, etc it’s fun to do:)” (Samantha)
Free service	4	“I can meet new people and also speak to my friends and family without using my credit or petrol” (Tina)
Planning or organising events	2	“I like using social networking sites because you can talk to your friends and arrange when you want to go out” (Giles)

*Three students did not provide an answer

5.2.1.3 Views on museums

The last part in QI (Part D) focused on students’ views on museums. The participants were asked to indicate the extent to which they agree or disagree with ideas expressed in a set of items. Table 5.4 shows the fifteen original items, grouped together on the basis of a construct that underpinned them, such as learning and artefact interpretation. For a description of the method see Chapter 4 (Section 4.5.5).

Table 5.4 Students' views on museums (Q1/Question D1) (N=22)

Items	Aggregated Data						Key metrics	
	1	2	3	4	5	Missing	Median	IQR
(1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree)								
Learning								
1. Museums are good places for learning.	5	15	0	0	1	1	2	0.5
2. In museums I always discover some new information.	6	11	4	0	1	0	2	1.25
3. The museum is a good place to learn in a different way to school.	7	14	1	0	0	0	2	1
4. A museum visit is a good chance to pick up new skills.	4	8	9	1	0	0	2	1
5. Museum visits give me lots to think about.	3	12	6	1	0	0	2	1
Artefact Interpretation								
6. I like looking at museum objects.	4	14	3	0	0	1	2	0
7. I find it difficult to talk about museum objects.	3	4	7	5	2	1	3	2
8. Some things are so hard to understand when visiting museums.	4	5	7	5	0	1	3	1.5
9. I find it difficult to make sense out of my visit to a museum.	1	2	8	10	4	0	3.5	1
General views/Feelings/Future Action								
10. I like visiting museums.	0	14	6	0	1	1	2	1
11. Visiting museums has been very inspiring for me.	1	8	10	2	1	0	3	1
12. Museums are boring.	1	0	9	10	0	2	3.5	1
13. I usually feel bored when visiting museums.	1	2	10	6	2	1	3	1
14. I would like to visit museums more often.	5	7	10	0	0	0	2	1.25

Past experience

Students visited museums in their free time (n=13), pointing to a group with prior experience in visiting museums. Few (n=5) expressed their disagreement with this statement. Table 5.4 shows that respondents did not hold strong views about whether

visiting museum has been inspiring for them (Mdn=3, IQR=1) (Item 11). Most respondents are positive to the idea of visiting museums (Mdn=2, IQR=1) (Item 10).

Learning

Table 5.4 demonstrates that students associate museums with learning. Their responses to all the items that are related to learning (Items 1-5) indicate agreement with such views. However, their responses to Item 4 that is related to skills development were neutral (n=9).

Artefact interpretation

There is strong consensus among students regarding 'looking at objects' (Item 6) (Mdn=2, IQR=0). Yet, opinions seems to be divided with regards to 'interpreting objects' (Item 7). Many students (n=7) expressed disagreement with this idea, but an equal number (n=7) seemed to agree (Mdn=3, IQR=2). Similar responses were collected for the Item 9, where, in fact, a few students (n=4) expressed a strong agreement with this idea (Mdn=3, IQR=1.5).

Feeling, attitudes and future action

Finally, in terms of the participants' feelings when visiting a museum data indicates a disagreement with the idea that 'museums are boring' (Item 12) (Mdn=3.5, IQR=1). However, many students (n=9) stayed neutral. Almost half the students (n=10) appeared neutral in their response to the item 'I usually feel bored when visiting museums' (Item 14) (Mdn=3, IRQ=1).

The open-ended question in Part D aimed at identifying motivations and factors that can make museums more appealing to students. The analysis showed that for many students

(n=12) a meaningful visit to a museum is associated with learning, essentially verifying the responses in the items in Table 5.4 (Items 1-5). Also, many (n=12) viewed a meaningful visit as associated with objects encountered in museums. The analysis also highlighted ‘personal interests’ as a reason to visit a museum (n=8), while a few (n=7) referred to the experience they have on-site, presumably drawing on previous visits they had (e.g. boring, challenging, social).

Table 5.5 Exemplar quotations associated with the question “What would make a visit to the museum meaningful for you?” (Q1/D16) (N=22)

A meaningful visit is associated with:	Number of Participants	Exemplar Quotes by participants
Learning	12	“It would make it meaningful if I picked up new skills and learned new information that I never knew before” (Harmony)
Object-based Learning	12	“It would be meaningful if I saw something very interesting e.g. old phones or arti[e]facts built a long time ago as it may help understand more & improve my knowledge of the item” (Tina)
Personal Interests	8	“If I am interested in a past history like e[E]gypt, greeks I like going to museums to learn more” (Keith)
Experience On-site	7	<ul style="list-style-type: none"> • “Doing lots of different activities at a museum would make the trip meaningful, not just looking at things but doing activities” (Nana) • “More fun objects and social stuff and amusements during a museum visit” (Faisal)

5.3 DESCRIPTION OF PRE-VISIT LESSONS

5.3.1 Blended Lessons (Lesson 1-Lesson 3)

This section provides a description and analysis of the lessons that took place in the school prior to the visit (Table 5.6). By the time of making the visit to the museum all students but one had created accounts on Twitter (Lesson 1/N=17; Lesson 2/N=21; Lesson 3/N=25).

During these lessons students worked in groups.

Table 5.6 Outline of pre-visit lessons

Pre-Visit Lessons (Study participants N=26)				
Blended Lessons				Traditional Lesson
	Lesson 1	Lesson 2	Lesson 3	Lesson 4
Lessons	Hiroshima Bombing	Cold War	Communication with a curator	‘Equality and Beliefs’
Duration	10’	50’	20’	50’
Topic	Drop of the atomic bomb	a. Cold war b. Capitalist/ Communist systems	Communication with a curator at the museum	Introduction to the ‘Scheme of Work’
Setting	classroom/ ICT suite	ICT suite	classroom/ ICT suite	classroom
Groups/ Individuals	in groups	individuals/in pairs	individuals/in pairs	individuals/in groups
Resources	<ul style="list-style-type: none"> • Twitter Stream • iPhones • PowerPoint Presentation 	<ul style="list-style-type: none"> • Twitter Stream • PCs • PowerPoint Presentation 	<ul style="list-style-type: none"> • Website • Map of MoL • YouTube • Twitter Stream • PCs/iPhones 	<ul style="list-style-type: none"> • Museum postcards
Data	<ul style="list-style-type: none"> • Data from Twitter • Observation notes 	<ul style="list-style-type: none"> • Data from Twitter • Observation notes • Homework assignments 	<ul style="list-style-type: none"> • Data from Twitter • Observation notes • Video data 	<ul style="list-style-type: none"> • Observation notes • Video data • entry-PMMs

5.3.1.1 Lesson 1: Hiroshima Bombing

Lesson 1 included a demonstration of Twitter’s basic features, e.g. hashtag. Students were prompted to follow the @MuseLearn account and they were further directed to find each other from @MuseLearn’s followers/following and also to follow the project’s list (@MuseLearn/oak2011). However, despite the earlier arrangements with the school’s IT staff, access onto Twitter was restricted, therefore a contingency plan was put in place.

This plan involved introducing the presentation ‘The Art of Looking and Describing’ to the students, which entailed a discussion around the importance of using historic sources. The second part of the contingency plan involved students using the Twitter application on iPhones and responding to the question “Can the dropping of the atomic bomb ever be

justified?”. This topic was related to the ‘World War II’ Scheme of Work that preceded the ‘Equality and Beliefs’ topic. Students worked in groups of four or five for this task, and in each group a student logged-into Twitter with his/her account. It should be noted that due to technical difficulties the time left to complete the task was limited (see Table 5.6).

5.3.1.2 Lesson 2: Cold War

The second pre-visit lesson was related to the ‘World War II’ Scheme of Work and focused on two concepts: ‘Cold War’ and ‘Capitalists and Communists’. The lesson was structured around three questions posted on Twitter by @MuseLearn. The first question, “What do you think a ‘Cold War’ is? Post your ideas here, using #oag2”, introduced the topic of the lesson. It was expected from earlier discussions with the teacher that a few students would have had some knowledge about this concept and hence, their online contributions would help the students with limited or no understanding to form an opinion. The second and third questions were: “#oag2 Are there any characteristics of a communist system that you reckon are good?#commnist” and “#oag2 Are there any characteristics of a capitalist system that you reckon are good?#caplist” respectively.

Regarding the last two questions, students were first directed to study a classroom resource in the form of a PowerPoint presentation related to capitalism and communism (see Appendix C). They were asked to check the characteristics of the two systems, e.g. ‘Hold elections to choose government’, ‘No Individual ownership of property’, and based on these to express an opinion online for or against the two systems. Two groups were formed based on the seating plan in the ICT suite, i.e. two rows in each group. A few students were working in groups of two or more. This activity was completed within 20 minutes.

Following Lesson 2, the students were assigned to write a paragraph defending one of the two systems. In their homework they could use the Twitter stream as a resource.

5.3.1.3 Lesson 3: 'Live' communication with a curator at the Museum of London

The main activity in Lesson 3 involved synchronous communication on Twitter among the participants and the Curator of Social Media at the Museum of London. A Twitter account (@MoLtrial) was created for the purpose of this lesson and was managed by the curator.

The hashtag suggested was #MoLtrial. Apart from this activity, Lesson 3 also involved screening a You Tube video about Galleries of Modern London in the MoL (MoL's official You Tube Channel <http://www.youtube.com/watch?v=vJCjeLoh1aE>)¹⁴ and exploring the museum's Website ('Visit us' and 'Learning' micro-sites). During Lesson 3, students were prompted to express expectations from the visit and to post questions/comments to the curator.

5.3.2 Traditional Lesson

5.3.2.1 Lesson 4: Introduction to 'Equality and Beliefs' Scheme of Work

Lesson 4 provided a brief introduction to the 'Equality and Beliefs' Scheme of Work, as well as some approaches in engaging with objects or images. Apart from the learning activities, this lesson involved the creation of the entry Personal Meaning Maps (PMMs) (see Section 4.4.5). What followed was a wide-class discussion around the topic 'Civil Rights' and a group activity, where students were engaged in a conversation around an image/postcard. Five postcards, all related to the museum's collections, were handed to the groups (see Appendix C, Table C4).

¹⁴ Last accessed 1 March 2011.
K.Charitonos/2015

5.4 DATA COLLECTED IN PRE-VISIT LESSONS

This section examines the data collected during the four pre-visit lessons: the first part looks at the three blended lessons, while the analysis of the lesson that introduced the Scheme of Work follows in the second part.

5.4.1 Blended Lessons (Lesson 1 - Lesson 3)

In this section the focus is on the analysis of the tweets collected during the three blended pre-visit lessons. The first part provides descriptive statistics of this data set, while the second part examines the data set by mapping the tweets (see Section 4.5.3 for a description of the method).

5.4.1.1 Descriptive numerical analysis of the tweets

For the purposes of the analysis here, the focus is on all the tweets that were collected during Lesson 1 to Lesson 3. Table 5.7 shows the classification of the tweets into broad categories that were identified in an open-coding of the data. These categories were created based on features of the tweets and content and they are not mutually exclusive. It is noted that a few tweets were posted outside the classroom (see Table 5.7, 'Beyond lesson' row). They were still relevant to the topic of the lesson and were therefore, included in the analysis.

As illustrated in Table 5.7, most of the tweets posted during the three lessons were related to the topic of the lessons (i.e. the 'On-task' row). The great majority of the tweets were original posts (i.e. the 'Original Tweet' row), while in Lesson 2 'hashtags' (i.e. the 'Hashtag' row) received a good response. In all lessons there were tweets contributing noise to the discourse, e.g. 'Kool', 'Happy Birthday Rachel' (i.e. the 'Off-task' row).

Table 5.7 Data from Twitter during the blended classroom lessons

Categories		Lesson 1 Hiroshima Bomb	Lesson 2 Cold War	Lesson 3 MoL Trial
		Number of tweets (total=23)	Number of tweets (total=73)	Number of tweets (total=40)
Time	during lesson	15	66	34
	beyond lesson (outside classroom)	8	7	6
Type of tweet	Original Tweet	23	72	34
	Retweet (RT)	0	1	2
	Direct Reply	12	32	4
Task (i.e according to instructions/ question)	On-task	16	47	23
	Off-task/Contributing 'noise'	7	19	11
Hashtag (i.e #oag1, #moltrial)		5	32	5
Addressing another user (incl. username or name in tweet)		16	33	30
Acknowledge group's names (collective task)		4	2	8

*@MuseLearn's tweets not included in the table

To elaborate on the categories of Table 5.7 a screenshot of the Twitter stream generated during Lesson 2 is used. Fig. 5.1 shows original posts which are numbered chronologically (t1 first, t7 last). Tweets t1 and t6 by @MuseLearn set the tasks. All the other tweets (tweets t3, t4 and t5) are on-task according to the instruction (i.e. the 'On-task' row). Tweet t2, on the other hand, whilst being on-task, refers to the previous lesson (Lesson 1). It addresses a specific user (i.e. the 'Addressing another user' row). Notably, tweet t7 (#oag2 it was called the cold war because the fighting took place in russia and the tech was to [too] intense it was also it took place in winter") provides an example of a misconception expressed by a student. This, however, was not addressed during the lesson.

In terms of @MuseLearn's tweets, apart from setting the tasks, a few were direct replies to the students' tweets, aiming to act as prompts to elaborate on their tweets and expand communication (e.g. @Kevin @Keith @Neil & Jack can you explain why you think 'they deserved it'?). Following each lesson, @MuseLearn was posting a tweet with a summary of the lesson.

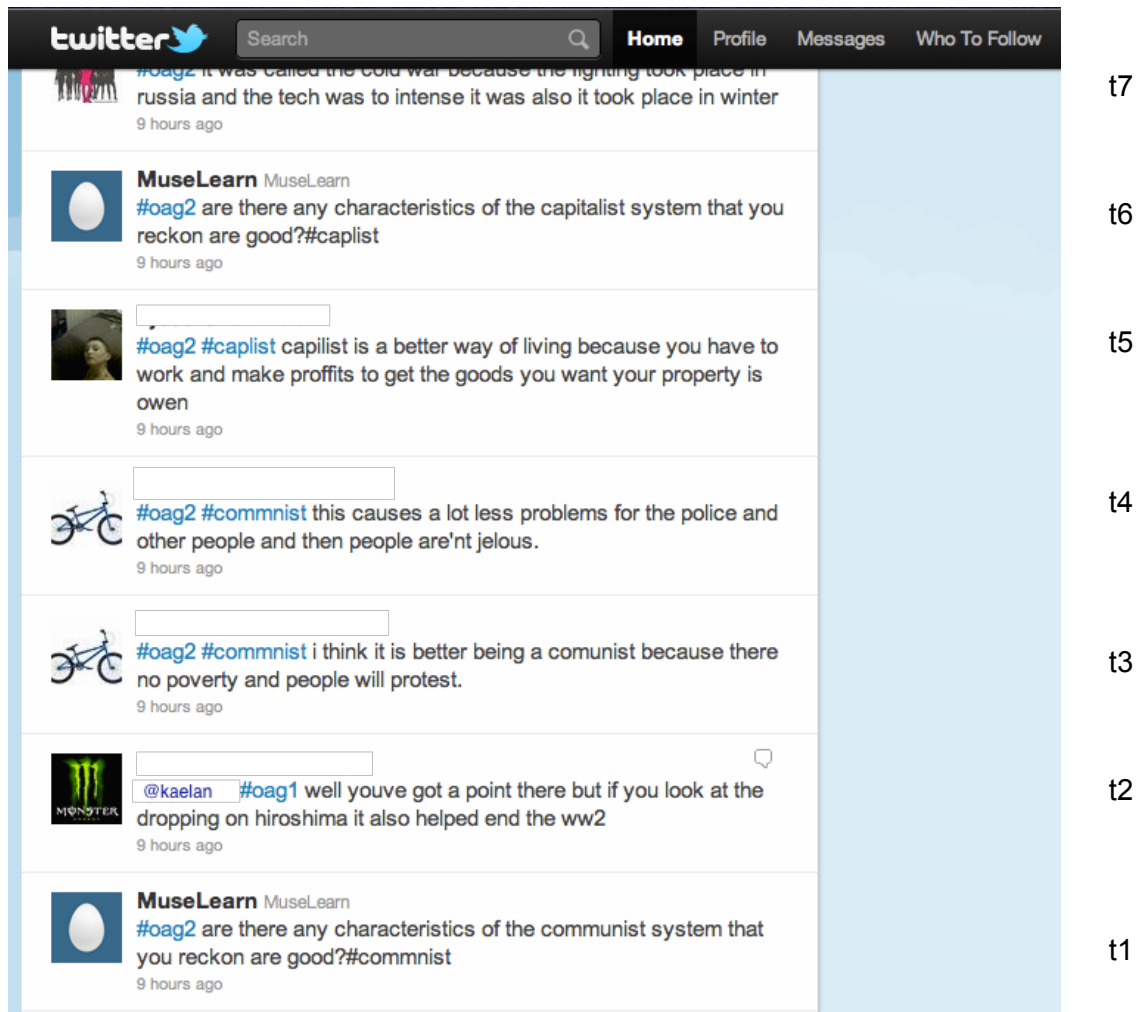


Figure 5.1 Snapshot of the Twitter stream in Lesson 2: Cold War

5.4.1.2 Mapping of the tweets

A. Lesson 1: Hiroshima bombing

The map in Figure 5.2 represents the interactions among six groups around the topic 'Hiroshima bombing'. The tweets (n=13) which were related to this topic are represented in this map.

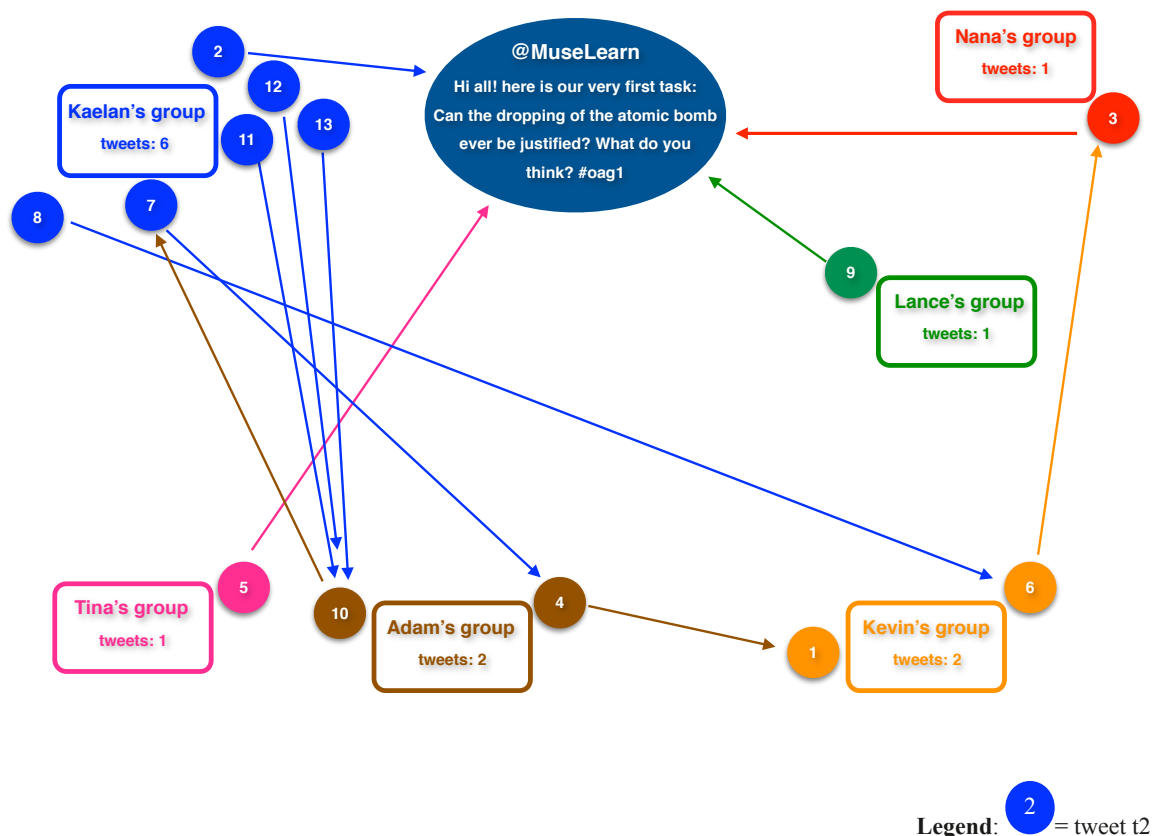


Figure 5.2 Map of Lesson 1: Hiroshima Bombing

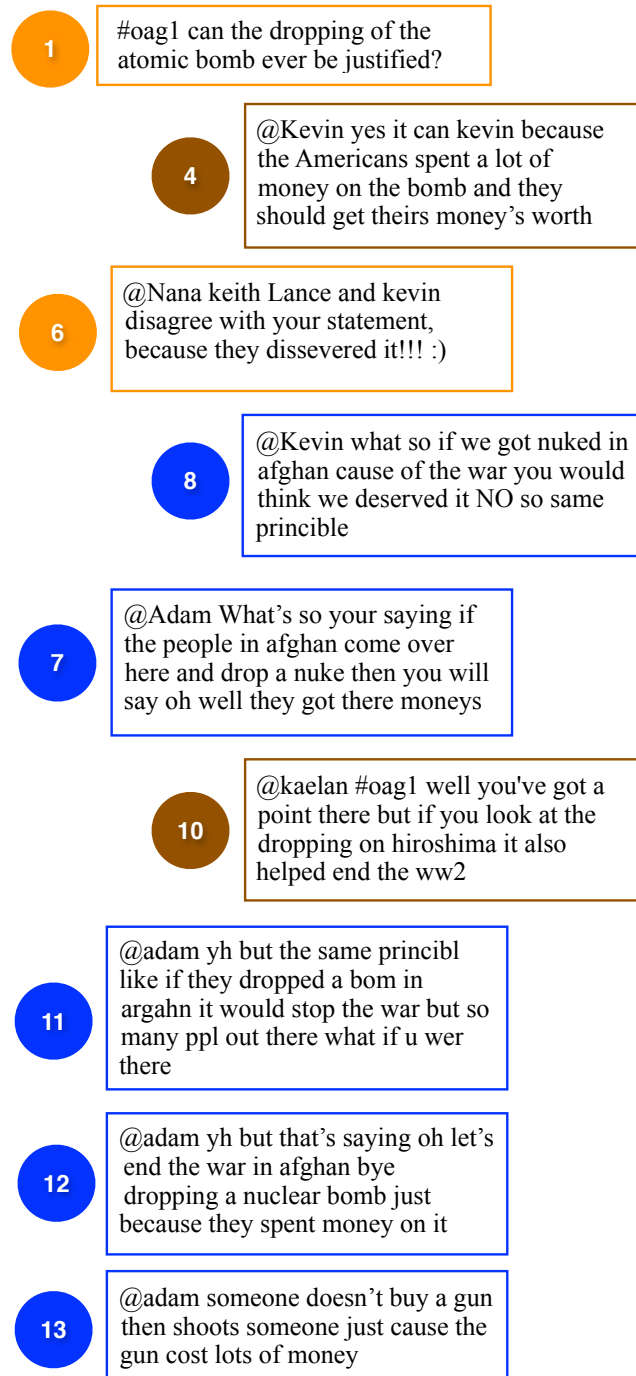
The groups/users are represented by rectangular shapes in various colours, while the tweets are represented by small circles, clustered around the users. The sequence of the tweets in the Twitter stream is shown by a number in each circle. For example circle 1 is the first tweet (t1) and circle 13 is the last tweet (t13). The arrows link a tweet which is a direct response to another tweet (e.g. in reply to). In all the arrows, the line originates from the

tweet/user who posts the tweet, with the arrow pointing to the tweet/user that is addressed. For example, the tweet t5 in Tina's group is a direct reply to the question posed by MuseLearn. A specific example of the exchanges among three students represented in the map (Fig. 5.2) is provided in Fig. 5.3 that follows.

Students were asked to use Twitter for the first time during Lesson 1. The map in Fig. 5.2 illustrates that participants could respond to the task, although as shown in this figure the interactions among groups mainly consist of a 'tweet-reply' pattern. This pattern differs in the case of three accounts, i.e. Kaelan, Kevin, Adam, and is the focus of Fig. 5.3 below. It is further discussed in the next paragraph.

Tweets posted provide some evidence that apart from expressing their opinion, students were also challenging other users (e.g. Fig. 5.3, Tweet 7, Tweet 8). Three tweets, in particular, included arguments for (e.g. Fig 5.3, Tweet 6) and against (e.g. Fig. 5.3, Tweet 4) the initial statement- with or without any reasoning. It is notable that more exchanges regarding this topic were posted by two accounts beyond Lesson 1 (Fig. 5.3, Tweets 7-13). To explain, Kaelan drew on a contemporary event—the war in Afghanistan—to challenge the tweets arguing for the dropping of the bomb (Fig. 5.3, Tweet 7, Tweet 8). Both students followed up on the same topic during Lesson 2: Cold War (Fig. 5.3, Tweet 10, Tweet 11), while following Lesson 2, Kaelan came back to the 'Hiroshima Bombing' topic and posted two more tweets addressing Adam (Fig. 5.3, Tweet 12, Tweet 13).

Hi all! Here is our very first task. Can the dropping of the atomic bomb ever be justified? What do you think?



Legend: 2 = tweet t2

Figure 5.3 Representation of an interaction on Twitter during Lesson 1

B. Lesson 2: Cold War

Data from Twitter (Lesson 2)

In total twenty-two tweets (N=22) associated with the debate around Capitalists and Communists were collected during Lesson 2: Cold War. These tweets, clustered around the eleven groups/users who posted them, are represented in Fig. 5.4. In parallel with the classroom activity a few exchanges among four students around other issues were observed and were extended beyond school as well. These exchanges are not the focus of this analysis and are not represented in the map. Notably, the four students who were contributing ‘noise’ (i.e. Kevin, Kaelan, Nana, Adam), were also actively involved in Lesson 2.

Compared to Lesson 1: Hiroshima bombing, more users/groups were involved in this activity. All the tweets, apart from one, are well formed answers with reasoning (e.g. “#oag2 #caplist capilist is a better way of living because you have to work and make proffits to get the goods you want your property is owen”). Fig. 5.4 shows that as with Lesson 1, most of the students’ exchanges follow the pattern ‘tweet-reply’, apart from two examples. These are analysed in detail to examine how the participants contributed to the discourse around this topic and how they drew on other tweets. The first example involves the interaction between Julian and Kevin (Example A) and the second example the interaction between Kaelan and Keith (Example B) (see Fig. 5.4).

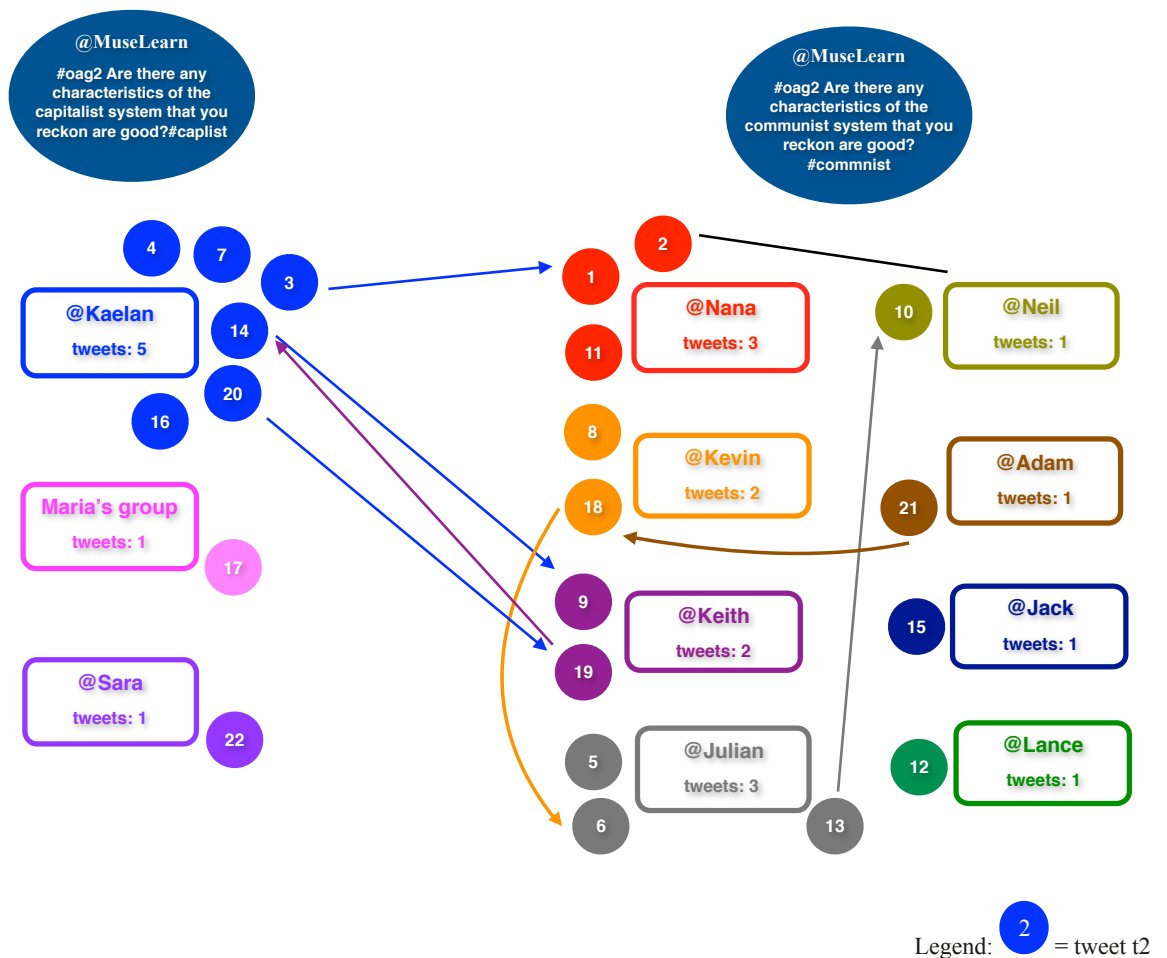


Figure 5.4 Map of Lesson 2 (Cold War): Communist - Capitalist Systems

Example A Interaction between Julian and Kevin

Lesson 2: Cold War (Data from Twitter)

In the first set of tweets shown in Fig. 5.5, Julian responds to the task and expresses a positive view in favour of communism. He seems to suggest that no poverty existed in the communist countries (Tweet t5). Since he views poverty as the origin of protests, he infers next (Tweet t6) that the police will have an easier role and people will not be envious of others. Kevin directly replies to Julian seeking clarification (Tweet t18). Yet, Kevin's tweet was never addressed. Similarly to Julian, Neil puts forward the idea of reduced crimes and poverty during communist era (Tweet t10). He draws on the list of characteristics provided

in the classroom resource (i.e. a PowerPoint presentation) and justifies his stance on the basis of property ownership. Julian expresses his agreement with Neil (Tweet t13). His tweet also provides evidence that the participants were reading the twitter stream.

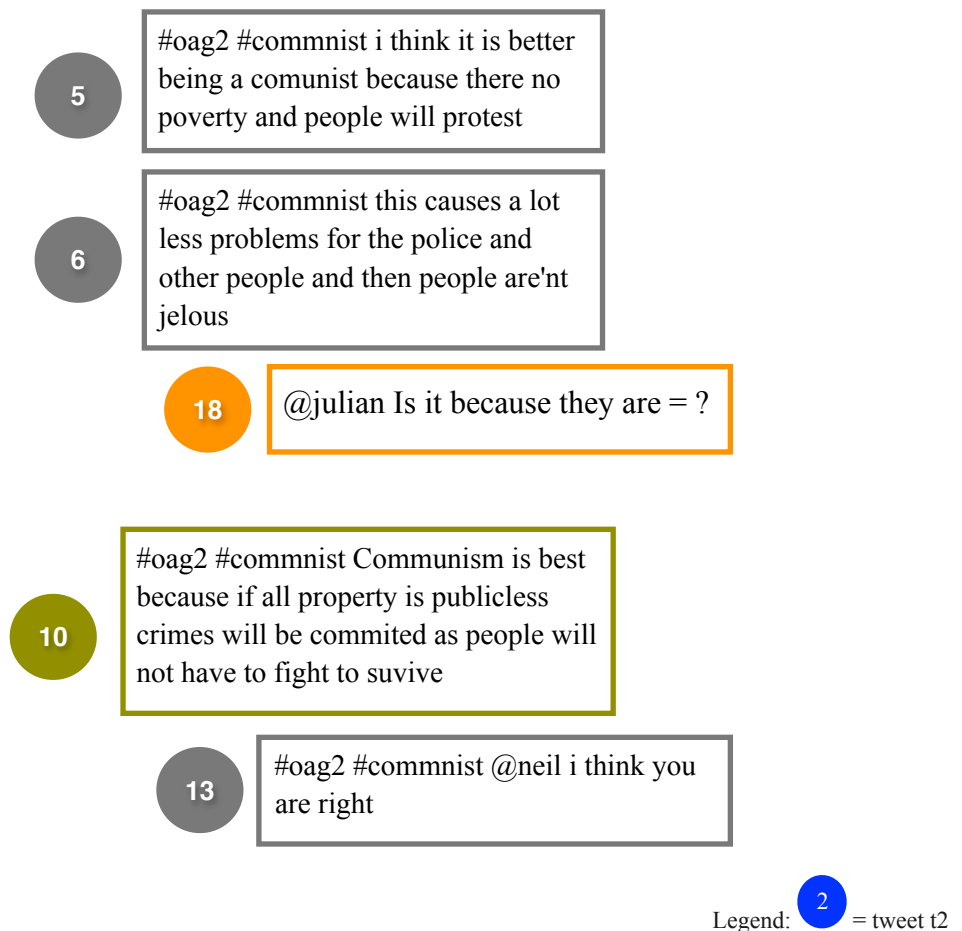


Figure 5.5 Representation of the interaction between Julian and Kevin (Example A, Lesson 2)

Two more tweets posted in the course of this activity share similarities and therefore, seemed to draw on the tweets in Fig. 5.5. The first tweet by Lance repeats the argument with the police (i.e. #oag2 #commnist it is the best cause it causes less problems withe the police), while the second tweet by Jack provides a generalisation about communist system (i.e. #oag2 communism is a great way of life it is simple and cause a lot less problems than capitalsim).

Example B Interaction between Kaelan and Keith

Lesson 2: Cold War (Data from Twitter)

In the set of tweets shown in Fig. 5.6, Keith responds to the task and tweets for the communist system (Tweet t9). He refers to the term ‘dictatorship’ that was included in the classroom resource (i.e. ‘One party dictatorship’). However, it is notable that positive meaning is attributed to ‘dictatorship’ (see tweet t9 “...live in a safe area”). Kaelan challenges his view (Tweet t14), also drawing on this resource (i.e. ‘Hold elections to choose government’).

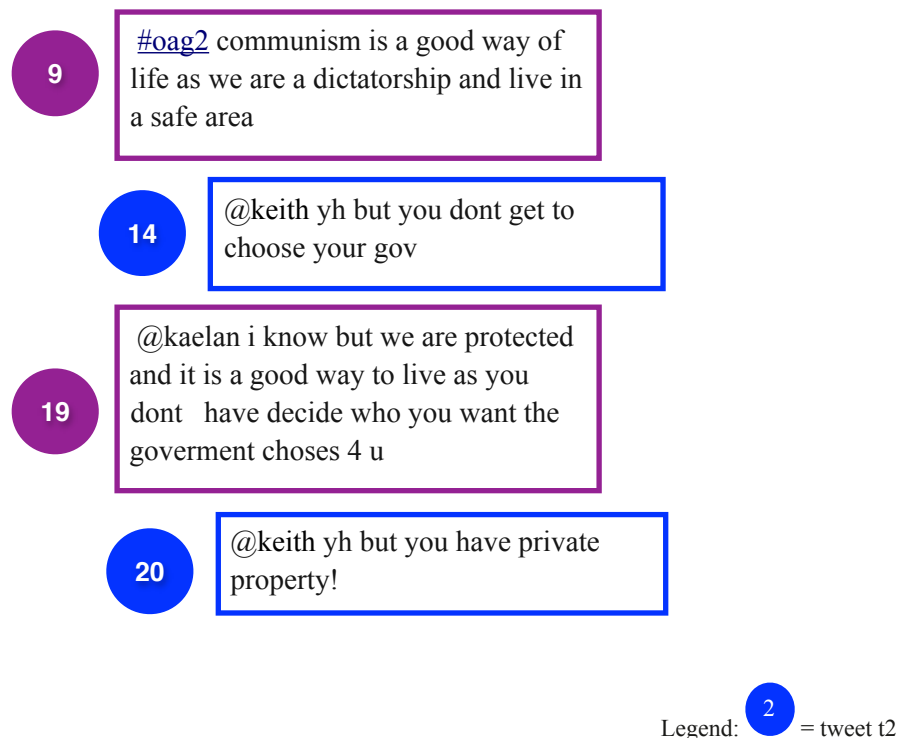


Figure 5.6 Representation of the interaction between Kaelan and Keith (Example B, Lesson 2)

Examining Keith’s reply (Tweet t19) it becomes clear that his understanding regarding the term ‘dictatorship’ is vague, since he refers to a government. In the same tweet, the notion that dictatorship has positive connotations is reinforced (see tweet t19 “...we are

protected...”). In the last tweet in this exchange (Tweet t20), Kaelan adds ‘property’ characteristic in this interaction, possibly with a scope to challenge Keith’s views.

Arguably, the tweets shown in Fig. 5.6 are well formed and follow specific communication rules. For example, despite his disagreement, Kaelan puts ‘yh’ [yeah] in the beginning of his tweets. Also, Keith’s response starts with ‘I know, but...’, which might be an indication of respect and understanding of what the other person is saying. It is interesting, that both boys seem to have adopted the role of a communist and capitalist: Keith uses ‘we’ and Kaelan replies to him by ‘you’.

In the following section a brief analysis of the homework activity assigned to the students in Lesson 2 is presented.

Data from homework (Lesson 2)

The participants were asked to write a short assignment to defend one of the two systems. The Twitter stream could be used as a resource in this assignment. In total, thirteen students completed this homework (N=13). The teacher received eight assignments defending the communist system and four texts defending the capitalist system (i.e. one assignment was a group work). Table 5.8 shows an example for each system.

The analytic attention in this data set concerned identifying whether the students were drawing on the Twitter stream when writing their assignments. In Table 5.8 the first column has the actual assignment and the second column tweets posted during Lesson 2 that are seen as have influenced students’ assignments. The same colours in both the

assignment and the tweets are used to point to parts where concepts, terms or phrases are found in both the texts and tweets.

Table 5.8 Examples of assignments in defence of capitalism and communism (Lesson 2)

Students' Assignments		Tweets		
		#1	#2	#3
Assignment 1	<p>We think capitalist countries are a better way of living because you have so much freedom compared to communist countries, for example, if you wanted to start your own boutique or any kind of shop, you would not be allowed, because you could possibly start to earn more money than other people, therefore making your life compared to others, unequal.</p> <p>In communist countries, all radio, television, everything was checked and approved or disapproved by the government, EVERYTHING is controlled. I.e. you have no freedom.</p> <p>In capitalist countries, you have the freedom to be unequal to people, so you can make more money by doing a hobby, you feel so free!</p> <p>[sent by: Sara and Harriet]</p>	<p>#oag2 #caplist You have more freedom, In communist countrys you feel very controlled, e.g if you wanted your own shop, you weren't allowed.</p>	<p>@kaelan i know but we are protected and it is a good way to live as you dont have decide who you want the government chooses 4 u</p>	<p>#oag2 #caplist private money and profit making</p>
Assignment 2	<p>I think that communism is the best option because it gives people a lot less problems for the police and other people and it stops people waiting [wasting] they're money on things that they don't need and they will have to save up to buy better things and bigger things which will be more money for the government and they won't have to pay people to do things they will just earn money apart from the wages and the government will be even richer because people in capitalist countries evade tax.</p> <p>[sent by Julian]</p>	<p>#oag2 #commnist this causes a lot less problems for the police and other people and then people are'nt jelous.</p> <p>#oag2 #commnist it is the best cause it causes less problems withe the police</p>	<p>#oag2 #commnist i think it is better being a communist because there no poverty and people will protest.</p>	<p>#oag2 communis m is a great way of life it is simple and causes a lot less problems than capitalsi m</p>

The analysis showed that most assignments (n=9) had some influence by tweets posted during Lesson 2. In five assignments (n=5) ideas expressed in the tweets, i.e. 'poverty', 'less crimes', 'equality', were included. Yet, additional elaborations, examples or associations with new ideas were given. This is illustrated by both assignments in Table

5.8. For example, the Assignment 1 draws on a specific tweet (Tweet #1) that refers to the

idea of ‘freedom’ and ‘control’ as associated with capitalism and communism respectively. The same idea underpins Assignment 1, and additionally the notion of ‘inequality’ is introduced as related to profit-making. A similar example to Tweet #1, however more detailed, is noted in this assignment to justify ‘inequality’. In Assignment 2 the idea of ‘reduced crimes’ related to ‘no poverty’—already examined in the previous section—is also re-visited in more detail in Julian’s text. Julian further makes a similar comparison to Tweet #3 (Tweet #3/Assignment 2) and suggests a problem he sees in capitalism, i.e. tax evasion.

Three assignments (n=3) had largely copied or integrated tweets without much change in the original syntax or content (Table 5.8, see Assignment 2 - in orange). It was also observed that in four assignments (n=4), students seemed to identify with the system they were defending, since they used personal pronouns (e.g. ‘Us capitalists’). This was possibly related to the role they were asked to play during the debate and was extended in this work. Additionally, in three assignments (n=3) no evidence was provided to suggest that students were directly drawing on specific tweets, even though ideas (e.g. ‘equality’), apparent in several tweets, were mentioned or paraphrased in these as well.

Finally, five assignments (n=5) were created by students who had no active participation on Twitter during Lesson 2: Cold War. Whereas there was evidence in three of these that they were drawing on tweets, misunderstandings in terms were noted, resulting in two of them not responding to the task. Having said this, there was no evidence to suggest that non-participation in the activity resulted in the failure of the follow-up task.

C. Lesson 3: 'Live' communication with a curator at the Museum of London

This section will look at the tweets posted during Lesson 3 and were either related to the communication with the curator at the MoL or expressed impressions about the museum after students watched a YouTube video and explored parts of the Website. Twelve tweets were posted by the curator (n=12) and twenty-three tweets (n=23) by the participants (excl. noise). All the tweets are represented in Fig. 5.7 and are clustered around the groups/users who posted them. The three tweets with the photo icon are tweets with links to images of objects. Fig. 5.8 that follows shows a snapshot of the Twitter stream during this lesson. Specific examples from Fig. 5.8 are used to elaborate points in the discussion.

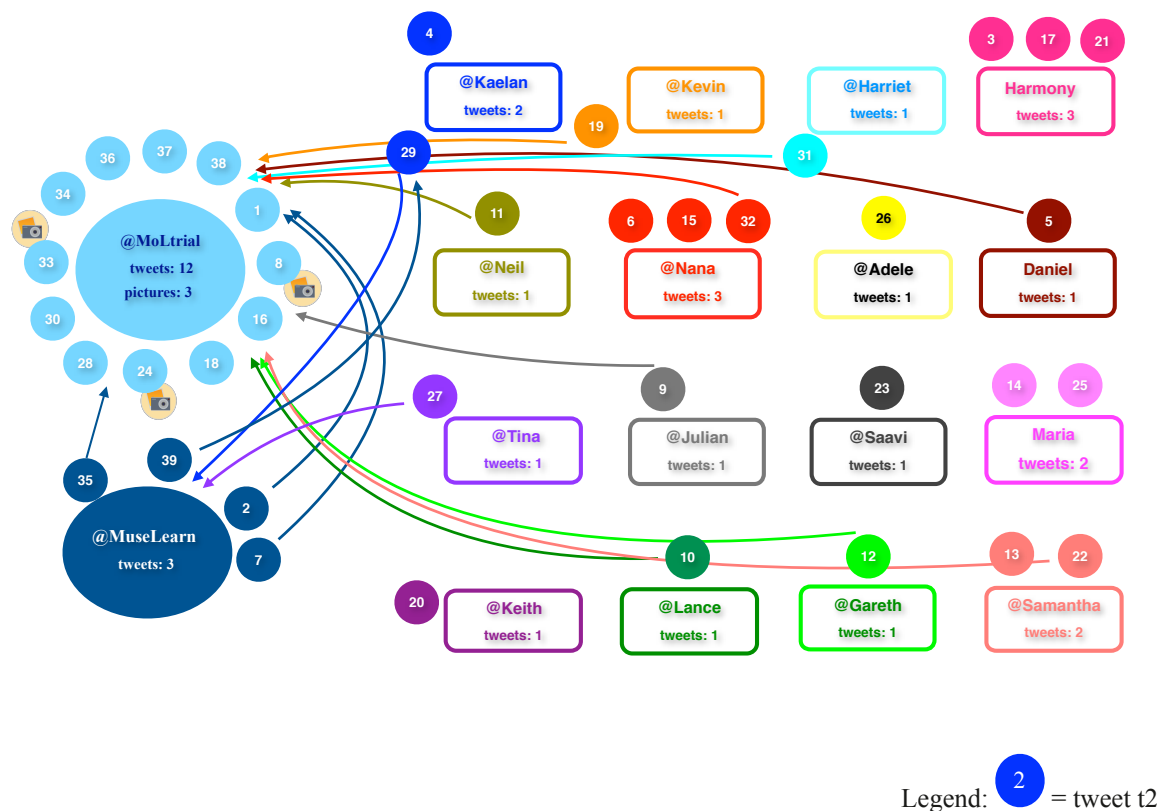


Figure 5.7 Map of Lesson 3: 'Live' communication with a curator

The tweets that expressed impressions about the museum were positive. Expressions used in their posts are indicative of this e.g. the museum as 'being/looking OK', 'fun', 'alright' and 'awesome'. Three students justify their opinion as the result of the video they watched,

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while one refers to both the video and the Website (e.g. “from what I have seen of the museum from the website and the video it looks okay!!!!!!”).

The map in Fig. 5.7 depicts a number of individual students/groups (n=16) posting items without many exchanges among each other. This is clearly a response to the task assigned to them, where questions or comments to the curator were the suggested format for their tweets. Indeed, fifteen tweets were formed as a question (n=15) addressing @MoLtrial or @MuseLearn (some tweets included more than one question). They were all related to the museum and its exhibits/galleries (Fig. 5.8 e.g. t4 and t7). Students’ tweets sought to get a personal opinion/response from the curator (Fig. 5.8 e.g. t3) or actual information to their questions, while three questions referred specifically to learning gains and links to school work (Fig. 5.8 e.g. t1 and t5). It is noted that questions such as “@MoLtrial is there some modern things as well as the old things?” are seen as related to the perception of museums mainly displaying old objects. Tweets posted by the curator were topic-specific (Fig. 5.8 e.g. t2), as well as demand-driven, meaning the curator was responding to questions posed by students (Fig. 5.8 e.g. t6).

Among the tweets posted to the curator, only one by Kevin had a specific reference to technologies (e.g. “@MuseumofLondon is the technology in the museum good and an easy way to give information?”). Similarly, only one tweet by Neil was linked to the topic of the visit (e.g. “@MoLtrial In the museum what are they key protesting exhibit's? And how in depth do they go? (Like how did the methods effect other people?”). Neil and Kevin will be among the students whose activity will be analysed in more detail over the next two chapters.

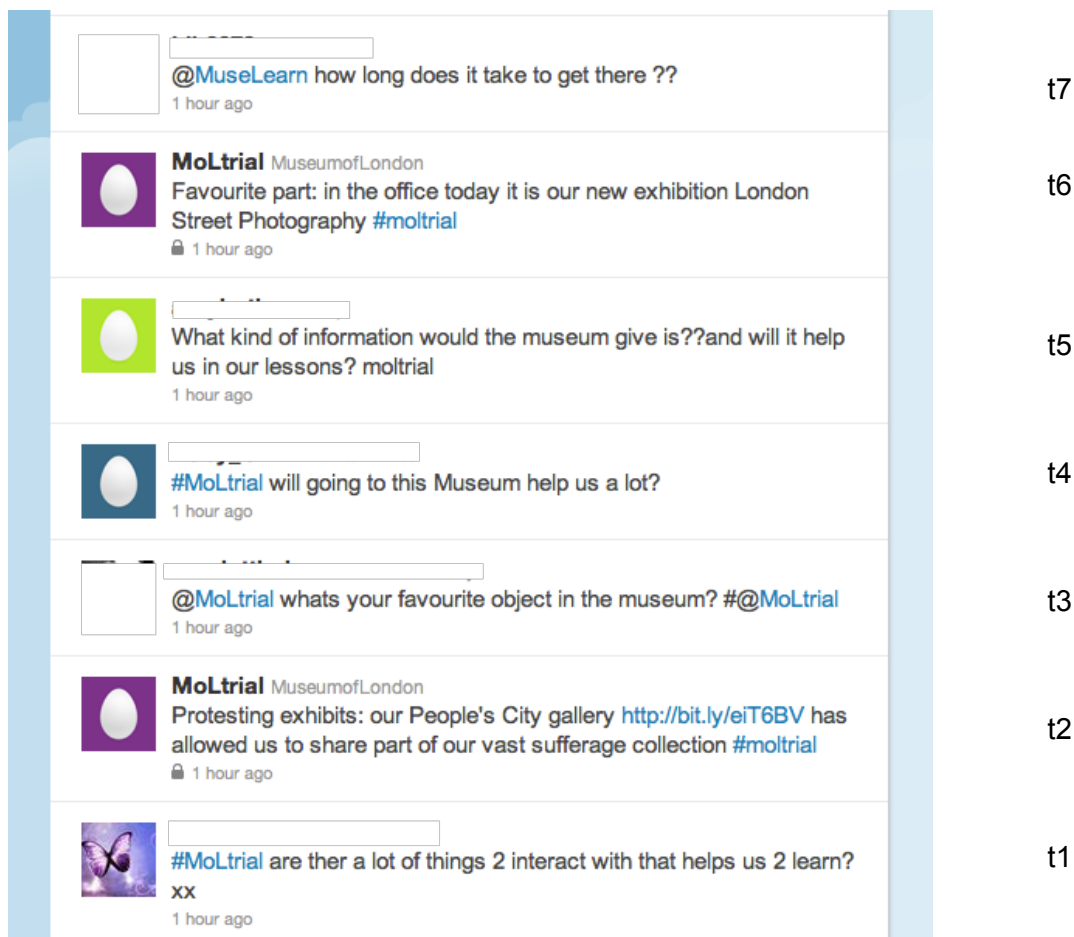


Figure 5.8 Snapshot of the Twitter Stream in Lesson 3: MoL Trial

5.4.2 Traditional Lesson

Lesson 4: Introduction to ‘Equality and Beliefs’ Scheme of Work

The data collected from Lesson 4: Introduction to ‘Equality and Beliefs’ Scheme of Work consisted primarily of observation notes and video data from one group of students. The analytic attention in this data set concerned identifying prior knowledge and understanding about the concept ‘civil rights’ among the participants. It is noted that the analysis of the entry-PMs that were collected in this lesson, is presented in Chapter 7 (Section 7.3.1).

In the Extract in Table 5.9, the teacher introduces the new scheme of work (lines 1-4) and directs students’ attention to suffragettes and black civil rights. From that point onwards

the teacher facilitates a discussion seeking to get a baseline of students' views on these subject.

Examining the extract, some background knowledge on suffragettes is noted, i.e. Adam's comment about suffragettes' colours (line 10) or the episode with Emily Davison at the Epsom Derby (lines 16-17). Here students presumably draw on things taught in previous years. Importantly, there seems to be an established understanding among students about protesting, which is defined by a dichotomy of violent-peaceful. In fact, a widespread perception seems to be that protest implies violent actions. The example given by Adam (line 16), alongside other students' comments are indicative of this (line 5-6). The teacher uses a well-known example (i.e Nelson Mandela) and reinforces this view, while also stressing how perspectives on what is violent/non violent shifts according to context (lines 19-24). Nana is the only one to challenge this view—and presumably express her dislike—with her question in line 27.

It is interesting that the teacher directs the question about black civil rights to Nana, who is a Black British student. Nana clearly embraces this role and address this question as if she is a storyteller (lines 33, 35). Whereas her narrative suggests a 'collective memory' (i.e. 'once upon a time'), this is not shared by everyone. The teacher then uses a historic fact (i.e. abolition of slavery) to link Nana's narrative with established subject knowledge. The teacher further uses the opportunity given by Adam's question (line 39) to draw students' attention on a controversy around Martin Luther King.

In this extract it is notable that the teacher does not persist in discussing historical content and subject. Rather, her attempt is to re-establish knowledge rooted in previous experiences, as well as to establish shared meaning with a purpose to make a connection to

Table 5.9 Extract from a wide-class discussion (Lesson 4)

Video Data 27:00 - 32:57 Classroom, 28 February 2011 T: teacher P: pupil	
1 2 3 4	T: I would like you to start thinking about the idea of equality and beliefs. It's going to be your next unit... So, we will be looking at suffragettes and also black civil rights. Which is why we are getting you to think of this idea of 'civil rights'. People have their rights and where are those rights are taken from? What things do you know about the suffragettes and civil rights at the minute? Nana?
5	Nana: (Some had to do with violence, some peaceful)
6 7	T: Excellent. So, you got the controversy, where you got direct action and violent protest and passive resistance and peaceful protest. Neil?
8 9	Neil: In all the...when they protest they do.... this is what people are saying and then...they needed a certain group ()
10	Adam: Suffragettes colours were green, white and purple
11	T: excellent! Anything else you know about them? So, what did the suffragettes fight for?
12	(many): Women's rights
13	T: Women's rights to?
14	P: to vote
15	T: Vote! Good. Adam?
16	Adam: One of, I think one of the main people the suffragettes had, started up in front of the (Queens' races)
17	T: Yeah, that's very good. Anyone remember the name of the person? (no answer) Emily Davison... Neil?
18	Neil: ()
19 20 21 22 23 24	T: Yeah, big fundamentalists people would do extreme things about what they believe in. You can argue there, I know it sounds a bit..., but Apartheid that is was mentioned earlier, Nelson Mandela, now is seen as (freedom fighter) but in South Africa at that time was called a terrorist. He told people to be violent, he told black people that if they create so much violence in south africa, SA would then be ungovernable and uncontrollable and that when they would start to make changes. So he told people to be violent, which obviously now would be associated with being a terrorist but he is know as a freedom fighter.
25	Sara: ()
26	T: it' getting slightly towards the media, so that more people see it. Yeah, definitely. Nana?
27	Nana: But you can do that without killing people and hiding right?
28 29 30	T: (refers to the two groups of women, one believing in violent methods and the other in non violent) Fighting about the same thing. And there's a judgment about which one was a better method. These are what you will be looking at in the museum. Neil?
31	Neil: with suffragettes, they had WWII, which ()
32	T: Black Civil rights. What do you know about that? Nana?
33	Nana: Well, once upon a time...
34	P: God no! [in the background]
35	Nana: ... in Africa, black people ()

36	T: In other words, slavery. And then, of course you got the abolition of slavery in late 1890's (). Big
37	issue with what they have associated themselves and live in a society where they could be totally
38	equal. And this is what black people fought for to have equal rights. Adam?
39	Adam: Wasn't Martin Luther King one of the people about black civil rights?
40	T: There's a controversy there [refers to her dissertation on the controversy on whether MLK helped
41	american black people in US) There are so many things that you could look at about civil rights, sort
42	of trying to get the right to vote, trying to get them good education and good housing, and things like
43	that. This is kind of linking with your 'equality and beliefs' topic on this Scheme of Work we are
44	looking at. Se we will focus mainly on suffragettes for the minute and what I'll do is...I'm going to
45	pass around (pack of cards)...

new activity in the museum. She refers to what students will have to undertake in their visit in lines 29-30: “And there's a judgment about which one was a better method. These are what you will be looking at in the museum”. Yet, she does not provide any further information on what the museum activities will involve. She also draws the students’ attention to the multiplicity of the term ‘civil rights’: “there are so many things that you could look at about civil rights, sort of trying to get the right to vote, trying to get them good education and good housing...” (lines 41-42). To accomplish this she draws on famous people of civil rights activism with whom the students were familiar and raises some key points, arguably salient to her.

Following this discussion, five postcards from the museum collection were handed out to groups. Students had to look at the image and engage in a conversation with their peers around this object. They were prompted to ask questions as a method to engage with the image, and identify parts in the image which they help them make inferences about it. Observation notes are available from one group, which was engaged in a conversation regarding a postcard (Appendix C, Table C4 - Image 2).

Examining the notes, the dichotomy violent/non violent is apparent in students’ comments. Sara, for example, calls the suffragette “a protester”, who “is getting her point across in a

subtle way but who does not show her feelings the way she wants”. Gareth evaluates this as a non-violent protest while Nana calls it “a very creative method”, “an everyday thing with a cool twist” and compares it with contemporary methods such as slogans in T-shirts. Lance, finally commented that suffragettes should “do this rather than breaking things”.

5.5 DISCUSSION - FINDINGS

5.5.1 Findings from the pre-visit Questionnaire

The pre-visit Questionnaire (QI) provided insights on students’ access to technology, use of the Internet and SNSs in particular, and views on museums. This section summarises the three main findings.

The first key finding is that students might lack the knowledge and skills needed to generate content online within the specific context. QI data showed that almost all participants had access to technologies that support Web 2.0 and were engaged in online activities frequently, that is 10-40 hours per week, i.e. playing games, sending/receiving emails, using SNSs, watching video clips, listening to music and finding information. This is consistent with findings from *EU Kids Online* project (Livingstone et al., 2011).

However, the analysis revealed that only a few participants were engaged with activities such as sharing artefacts (e.g. pictures, video, text) or producing and publishing content (i.e. blogs, journals) that involves creation of new content online. This is similar to a finding reported by Becta (Crook et al., 2008) and indicates that participants might lack knowledge, as well as the set of skills needed to engage in generating content online.

Given that this was a key aspect of the research design, it was anticipated that the pre-visit blended lessons could address this.

The second key finding is related to the use of SNSs and suggests that the main motivation for students to engage with SNSs were related to social reasons, that is for interacting with one's existing social network (i.e. friends and family). Social presence and social related factors have been identified as the main factors influencing intention to use SNSs (Cheung et al, 2011). Similar findings have been reported elsewhere (boyd, 2007; Crook et al., 2008; Rainie et al., 2011; Livingstone et al., 2011). The fact that SNSs provide a free service, alongside the potential to reach new people and plan events appeared appealing to a number of students. The analysis also showed that participants did not consider learning among the benefits they can gain from their engagement with SNSs. As a result, social technologies were not viewed as being a part of the learning process. This is related to Buckingham's work who argues that young people's technologies, "embedded in the everyday culture of their peer group", are "largely dominated by the desire for communication and entertainment" (quoted in Clark et al., 2009, p.57).

The third significant finding of the analysis of the pre-visit questionnaire relates to students' views on museums and shows that the large majority held strong views on associating museums with learning. For example, in terms of the question about what consists a meaningful museum visit, the most cited response involved visiting a museum to support their learning. In other words, the prism through which the students view the museum is as 'explorers' (Falk, 2006)—they expect to find something that will fuel their learning during a visit. The data showed that many participants have visited museums in the past. Yet, opinions were mixed as to whether feelings of boredom were associated with visiting a museum. Regarding engagement with museum objects, 'looking at objects' received strong acceptance among students, despite an expressed awareness pointing to a

lack of skills in interpreting objects. What is more, a few students acknowledged that the museum might be a challenging environment.

5.5.2 Findings from the pre-visit classroom lessons

The pre-visit lessons provided students with opportunities to use the technologies they were going to use during the visit and introduced them to new forms of communication with peers or institutions within the particular setting. The analysis revealed the following key points.

The first finding is that students could respond to the specific tasks assigned to them and could use Twitter to extend interactions with peers in a classroom setting, also shown by Junco et al. (2011). The majority of students (n=19) contributed and/or responded to other content, i.e. asked questions, read comments, expressed what was happening in the classroom, which provides evidence of engagement with the tool (Gao et al., 2012) and the type of the activity. A few further established an individual online presence in this medium. At the same time, a few contributed ‘noise’ to this space. In hindsight, explicit rules regarding the use of this tool in the classroom should have been set in advance (e.g. in school only use Twitter on a course related way). Other students (n=7) were not actively participating online. It was observed, though, that their names were acknowledged in tweets posted by other users, hence pointing to group work. This aspect was acknowledged in the analysis preceded and the views expressed on Twitter during the classroom activities were seen as reflecting group views, unless otherwise stated. Overall, being aware that the activities were not graded might have affected students’ participation.

The second finding is that microblogging allowed the visibility of views, opinions and interactions across the groups. This was a feature praised by the participants, as the analysis in the following chapters will illustrate (see Chapter 7). At the same time, Twitter also allowed the visibility of misconceptions (e.g. cold war, dictatorship). A tool that allows the teacher to ‘assess opinions’ (Grosseck & Holotescu, 2008), note misconceptions and potentially address them during a lesson can be particularly useful in teaching. The language employed by students on Twitter is also noted (e.g. all think the droppin of da hiroshima bomb was very silly!!!). This form of language is commonly used in social media, however in a classroom context it is avoided. While this finding is not relevant to the thesis’ RQs, it is noted as it was a recurrent pattern in the analysis of the online discourse.

The third finding is related to classroom dynamics and context of the activities, which were constantly in flux due to the use of the technologies. Having a real-time feed at the core of the lesson design meant that the boundaries between offline and online activities were blurred or ‘collapsed’ (boyd, 2009). The students’ attention was distributed between multiple channels of communication and various resources. As a result, the context of learning became ‘unpredictable’ (Elavsky et al., 2011) and less constrained. Indeed, despite designing a lesson for a known purpose (e.g. cold war) and physical setting, the use of microblogging and the unpredictable nature of the real-time feed impacted on features established in a classroom. There was an increasing need for the teacher to manage the learning activity and the technology. Whereas this may provide opportunities for new teaching (and learning) practices to be developed, it might also require developing practices for better understanding phenomena and features at play. For a teacher this might be an ‘additional burden’ (Sharples, 2015).

The metaphor of ‘orchestration’ has been suggested to describe the planning, management and guidance of learning by a teacher when the use of technology is involved (Dillenbourg & Jermann, 2010). Evidence in the analysis of the pre-visit lessons is limited. It was observed that the teacher kept a relatively non-interactive manner in terms of her involvement in the online activities. For example, she opted not to have a Twitter account. Retrospectively, it could be argued that this resulted in her maintaining a distance from the activities and to appear as an observer herself, whilst it also restricted her from having first-hand experience for the tool. She showed unwillingness to use the Twitter stream as a resource that could remind students about previous lessons or to build-on or connect previous lessons to the next ones or to mark and structure key misunderstandings in subject knowledge (i.e ‘Cold War’ or ‘dictatorship’). It is acknowledged, as others have (Selwyn, 2011b), that for a teacher to change established teaching practices to use technologies that will certainly make a classroom environment more complex, is not a straightforward task. In fact, this situation was particularly challenging for the teacher in my study. Note that during the interview the teacher referred to other teachers’ fears or reluctance in using technologies in the classroom. This is further discussed in the analysis of the interview data in Chapter 7.

Another point for discussion is whether the use of a microblogging technology allows specific types of communication and sharing of knowledge. Part of the analysis focused on students’ assignments in defence of the two political systems. Analysis suggested that students were drawing on ideas expressed in the tweets to create their assignments, either by copying, mixing, re-interpreting or challenging ideas. Still, it is not possible to suggest that Twitter fostered “the combined knowledge creation of a group” (Kassens-Noor, 2012, p.19). The detailed analysis of the two online interactions showed that students

‘listened’ (Wanker, 2009) to others—they could draw on each other to form an opinion and followed specific rules to establish communication channels.

In addition to this, part of the analysis focused on the communication with the curator and evidence was provided that Twitter was used as a tool to get ‘instant feedback’ (Decosta et al., 2010) and to ask questions (Ebner, 2009). However, the ‘instant’ nature of this communication also highlighted that responding to a flow of micro-posts was not straightforward. Depending on the design of the activity, interactions among the participants could be facilitated and enhanced (i.e. many-to-many) or could resemble a one-to-many pattern of communication. For example, multiple exchanges were observed in the debate about capitalism and communism, while in the analysis of Lesson 1: Hiroshima Bombing and Lesson 3: Communication with the curator, a pattern of a single distributed conversation along a few intermittent, loosely joined dialogues between users was revealed. This point was illustrated by the visual representations provided in this chapter.

With regard to the development of the research design, the pre-visit activities were useful in utilising both synchronous and diachronic types of communication in Twitter (see Section 2.1.4). Regarding synchronous communication, this was highlighted in the lesson involving communication with the curator (Lesson 3). Interview data shows that the participants and the teacher liked this activity (see Chapter 7). Regarding diachronic communication, evidence in this chapter showed that a few posts or interactions endured over time and could be revisited and allow for new interactions to be exchanged (Lesson 1). The tweets could be seen as a cue for students to recall previous interactions and to initiate and maintain a continuity of the specific topic across time and lessons. In other

words, in the pre-visit lessons, microblogging provided some indications that it enables learning activities to be initiated, suspended and then restarted, which is central to the notion of seamless learning (see Chan et al., 2006; Sharples, 2015).

Finally, the pre-visit lessons offered some primary indications to the researcher about which students to focus on. For example, Neil with an expressed interest in tweets regarding protests, Kevin with an expressed interest in tweets regarding technologies, Nana where classroom interaction revealed that she firmly identifies herself as Black British, Kaelan, with an active participation on Twitter and high expectations from the visit and Adam, who had subject knowledge on civil rights. It also identified students with no participation online (e.g. Rita, Sana). These are among the students whose activity is tracked more closely over the next two chapters.

5.6 SUMMARY

Chapter 5 provided the analysis of pre-visit activities that prepared students for the museum experience. It also set the profile of the participants. This chapter, importantly, marked the beginning of a temporal analysis in recording and attending to the entire visit experience with a view to examine whether microblogging assisted in capturing experiences in classroom and continuing/moving from different setting (RQ2). The following chapter focuses on the trip to the museum. It documents the students' experience with an aim of identifying how the use of microblogging contributes to their visit experience (RQ1).

CHAPTER 6

RE-TRACING THE VISIT EXPERIENCE

Chapter 6 focuses on the visit to the Museum of London to document how different aspects of the students' experience are represented and communicated online. The chapter emphasises content creation in a museum and provides a view of how microblogging was used in the museum setting to examine how it contributes to the students' experience (RQ1). In this approach every 'resource', 'tool' or 'artefact' (i.e. tweets, mobile phones, museum object, label, photos, talk) the students encounter in the learning environment may have a key role in the learning process.

The objective of the museum activity was to draw the students into new forms of communication and potential spaces of interactions in a museum setting. The participants were not experienced museum visitors, although the pre-visit questionnaire showed that they had visited museums in the past. It was thus reasonable to assume that they had some familiarity with formal visiting practices, i.e. attending to artefacts and negotiating around the space and other visitors. To help them with this process a worksheet was provided that suggested a trail in the galleries and activities that students could perform. The stated goal of the museum activity in the study was to investigate an inquiry. The general actions required for this investigation were navigating through the museum, selecting and discussing objects relevant to the theme of the visit or of interest and communicating

knowledge and understanding to their peers. An explicit sub-goal of the activity was that students would share their interpretations online and take photos at various locations, which they could also post online.

Data collected in the museum comprises face-to-face and online interactions, video data, observation notes and user-generated data. The analysis includes examining how the students performed the tasks and how their engagement with various resources and tools contributed to their experience (RQ1). The analysis further includes examining the artefacts the students created (i.e. photos, tweets) to help answer the question about whether these artefacts help in extending the experience beyond the museum (RQ2).

The purpose of the analysis is to maintain a general overview of the events, while simultaneously isolating detailed and representative events. Therefore, the first part of this chapter (Section 6.1) provides an overview of the visit by focusing on the online discourse generated in the museum. The second part (Section 6.2) investigates the visit experience and focuses on specific events that provide evidence to help answering the RQs. Particular emphasis is put on the tools and resources the students employed. The findings from this analysis are discussed in Section 6.3 and finally, a summary of the key points raised in this chapter is provided in Section 6.4.

6.1 OVERVIEW OF THE VISIT

In total seven groups took part in the study. An outline of the groups and their inquiries is provided in Appendix B (Table B1). Groups with more than three members had two iPhones. For a detailed description of the visit plan see Chapter 4 (Section 4.3).

6.1.1 Data collected from Twitter

This section provides the analysis of the data collected from Twitter to identify whether it enables meanings to be made. The role of the tweets as part of the resources available for meaning making and the functions that the micro-posts have in the development of the students' understanding are discussed.

The section is organised as follows: first, an interpretation of the visit through a descriptive numerical analysis of the tweets is provided. This is followed by a representation of the online discourse and a detailed analysis of all the tweets posted in the visit.

6.1.1.1 Interpreting the visit through a descriptive numerical analysis of the tweets

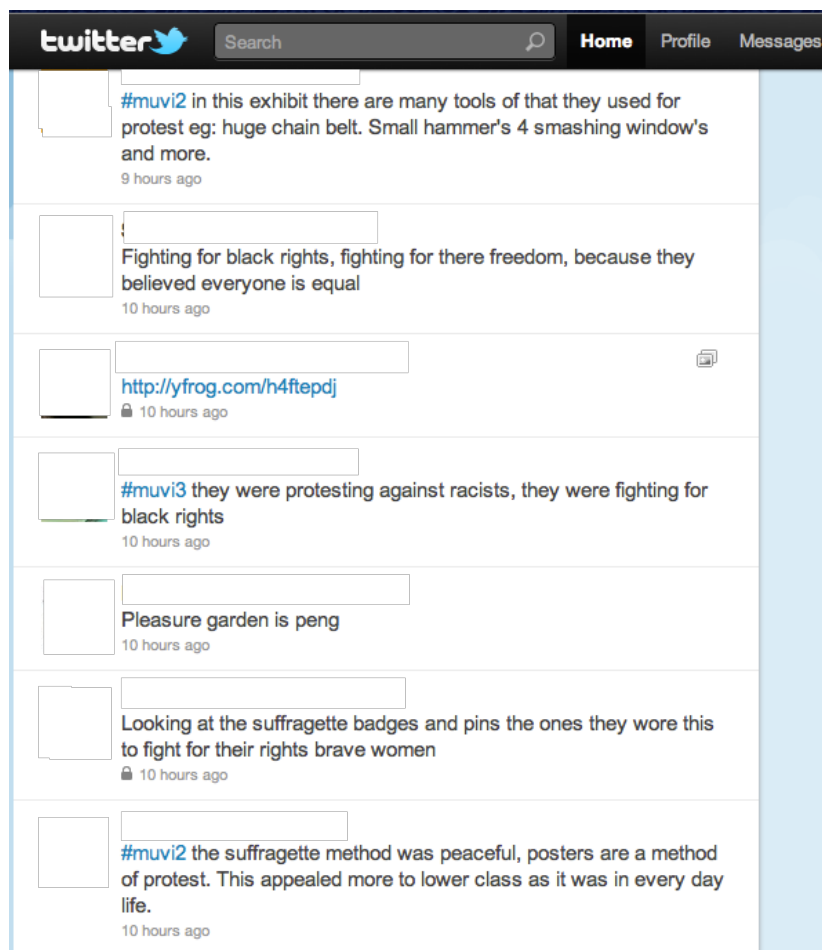
In total, seventy eight tweets were posted during the visit. These tweets were classified into nine broad categories that were identified in an open-coding of the data, i.e. features of the tweet and content (see Section 4.5.3 for a description of the method). A snapshot of the twitter stream is shown in Fig. 6.1.

Table 6.1 shows that all the tweets were original posts (n=78). Two thirds were linked to activities related to the aim of the visit (n=52), and some (n=17) acknowledged that this was a collaborative activity. A high number (n=70) related to the museum and its discourse, even though not all were addressing the tasks assigned (n=26). For example, the tweet "Pleasure gardens are peng" (Fig. 6.1) was off-task, though still related to the museum. Importantly none of the tweets was related to a participant's extracurricular interests. All the tweets with URLs (n=14) had a picture of a museum object posted online. Finally, nine (n=9) tweets were direct replies.

Table 6.1 Data from Twitter during the museum visit (N=78)*

Categories		Number of tweets
Context	in the museum	75
	on the bus	3
Type of tweet	Original Tweet	78
	Direct Reply	9
Task (i.e according to trip's aims/ group's inquiry)	On-task	52
	Off-task	26
Social Dimension	us/we/our	17
	I/me	6
	not applicable	55
Hashtag in tweet)		28
Links to photos (URLs)		14
Related to museum and its discourse		70
Related to the trip (issues/management/logistics)		8
Related to participants' extracurricular activities/interests (noise)		0

*@MuseLearn's tweets are not included (n=1)

**Figure 6.1: Snapshot of the Twitter-stream during the visit**

6.1.1.2 Interpreting the visit through mapping the tweets

The map in Fig. 6.2 shows a map of all the tweets posted by the seven groups on the day of the visit (see Section 4.5.3 for a description of the method). The photo icon is placed next to tweets that included a photo. A list with all these tweets is provided in the Appendix B (Table B4).

The map shows that all, except one group (Group 3), posted on average a similar number of tweets. The connections are limited and all represent direct replies. Where tweets are linked to other tweets, they tend to consist of a single exchange, i.e. ‘comment-reply’ pattern. This is evident by the fact that some tweets are linked to other tweets, but are not linked back (e.g. tweet t34 - tweet t39). This pattern of interaction is also illustrated by the interactions shown in Fig. 6.3 (i.e. on-task interactions).

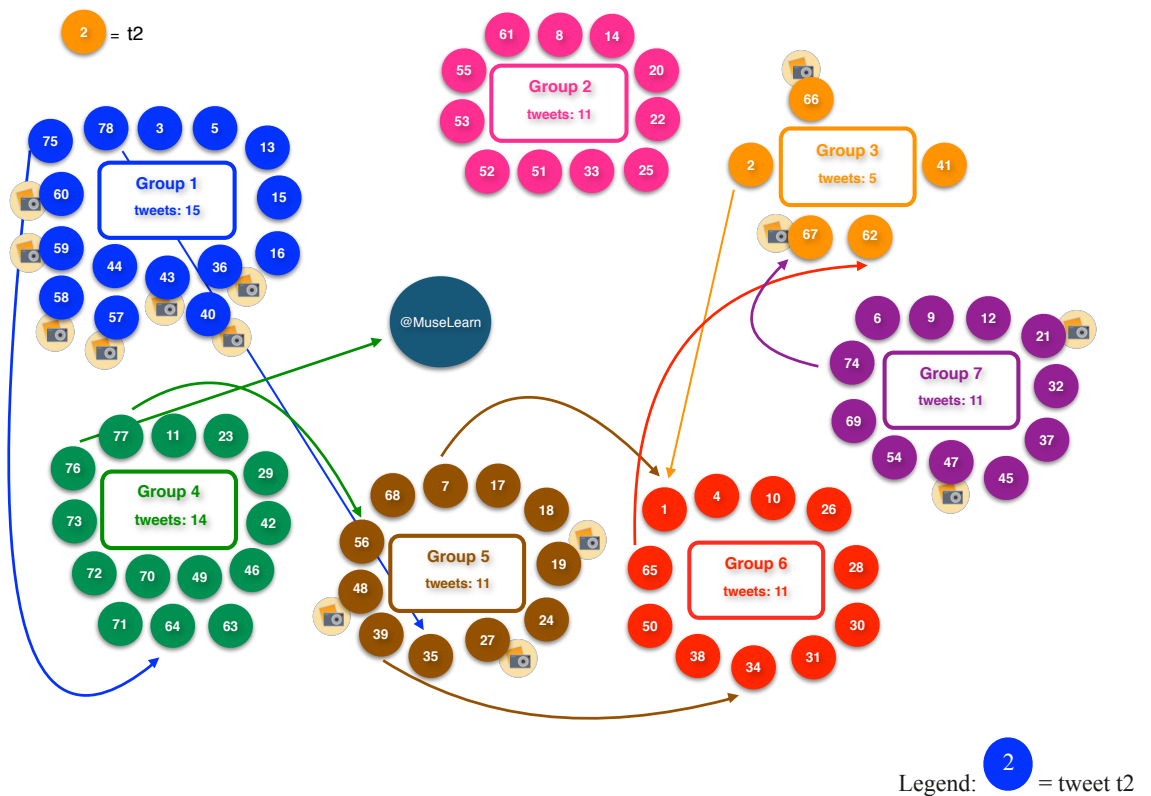


Figure 6.2 Map of the tweets posted in the visit

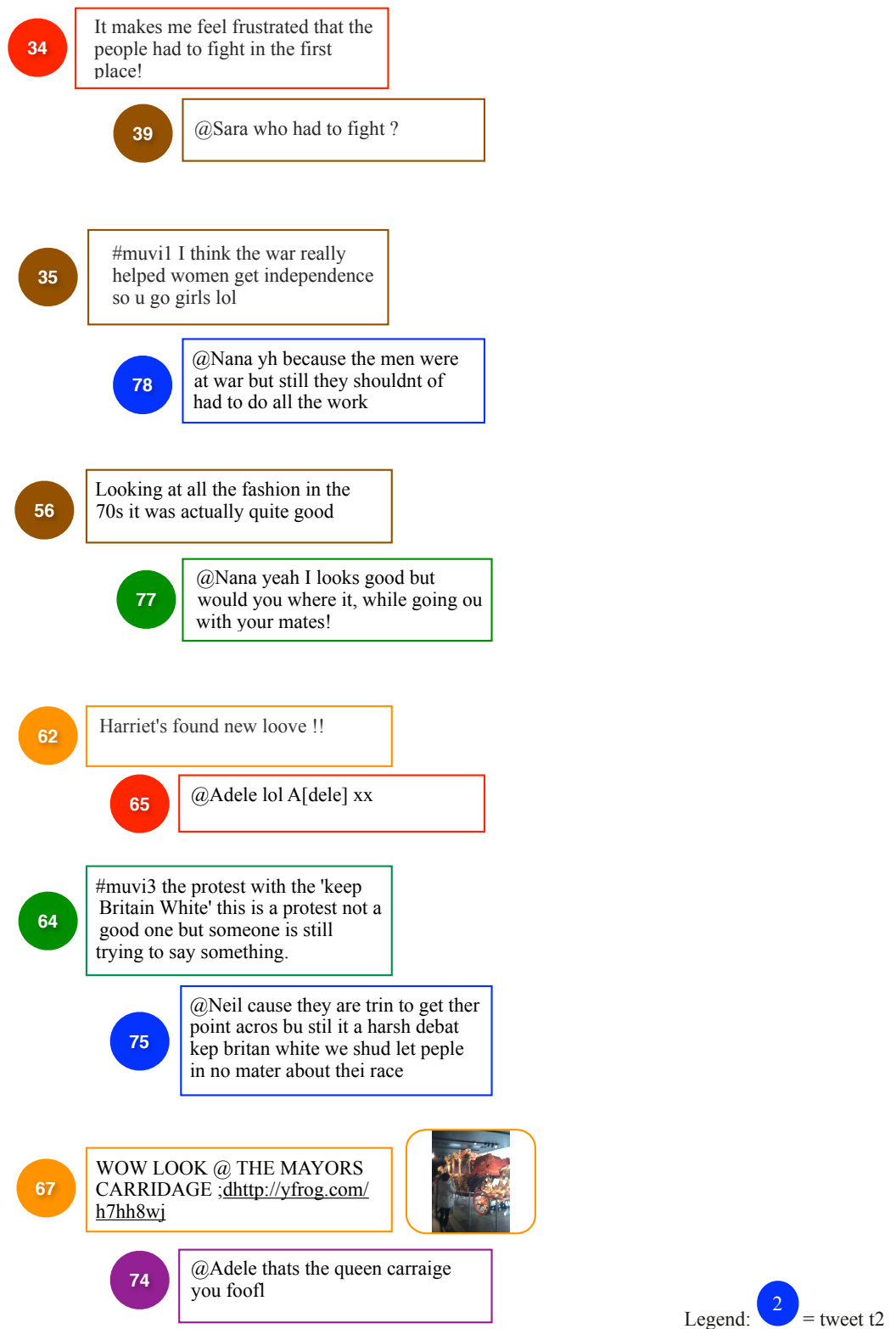


Figure 6.3. Representation of the on-task interactions among the participants

The following section will focus on the analysis of the content of the tweets.

6.1.1.3 Analysis of the content of the tweets

An analysis of the content of the tweets was carried out to identify the precise role of the tweets in the wider online discourse. Each of the seventy-eight tweets was coded according to eleven characteristics that emerged from the data (see Chapter 4, Table 4.1 for codes and characteristics). Table 6.2 shows how often these characteristics appear in each tweet per group. A table illustrating the process with specific examples is also provided in the Appendix B (Table B5).

Table 6.2 shows that Group 1 was partly on task (Category: Responsive). However, out of the nine 'responsive' tweets, six of them were responses to initial instructions, i.e setting up the account and expectations from the visit. This group was mainly contributing tweets with photos and text (n=7). Yet, none of photos were related to the theme of the visit.

Group 2 has contributed informative tweets (n=8), but it is notable that none of them is related to the theme of the visit. Tweets from this group were also expressing feelings (n=4) as well as ways that they were experiencing the visit (n=5). Group 3 posted in total five tweets (n=5), none responding to the theme of the visit. All the tweets were expressing feelings and three of them referred to specific artefacts.

Table 6.2 shows that Group 4 was largely on task, providing answers to some of the questions in the worksheet and looking for evidence for their inquiry. Group 4 was contributing information, all related to the theme of the visit, as well as evaluations and interpretations of their own ideas and opinions. It is also noted that Group 4's tweets are purely textual, although the group had in total eleven photographs saved on the iPhone, all related to specific things that this group encountered and tweeted about. On the other hand, Group 5 contributed a high number of tweets giving examples or expressing feelings or

describing their personal experiences. Further, Group 5, has three tweets including photographs and text. Group 6 was largely on task, providing answers to some activities of the worksheet. They contributed a relatively high number of tweets with arguments (n=5), as well as feelings (n=5). Finally, Group 7 also seemed to be on task. However, similarly to Group 1, out of the seven tweets, three were responses to initial instructions, i.e setting up the account and expectations from the visit. Group 7, contributed four tweets referring to specific objects.

Table 6.2 Characteristics: Function of the tweets posted in the museum

Code	Characteristics	Count						
		Group 1 (n=15)	Group 2 (n=11)	Group 3 (n=5)	Group 4 (n=14)	Group 5 (n=11)	Group 6 (n=11)	Group 7 (n=11)
RES	Responsive	9	2	0	12	6	9	7
InT	Interpretive	3	4	1	5	4	4	3
INF	Informative (theme of visit)	2 (1)	8 (0)	2 (0)	9 (8)	4 (2)	3 (0)	1 (1)
	(general information)	(1)	(8)	(2)	(1)	2	(3)	(0)
EVA	Evaluative	4	4	1	7	3	1	1
INT	Interrogative	0	1	0	1	1	0	0
JUD	Judgmental	0	0	0	1	1	0	0
ARG	Argumentative	3	1	0	4	0	5	1
ILL	Illustrative	7	3	3	5	6	1	4
EXP	Experiential	0	5	0	1	3	1	1
AFF	Affective	8	4	5	4	3	5	2
REF	Reflective	1	2	0	1	1	1	1

Overall, in Table 6.2, one may note the lack of questions, judgments or reflections across the groups. It gives a picture of the type and quantity of contributions to the conversations that each group has made. Finally, it allows for some conclusions to be drawn about each group's performance in association with the visit goals.

6.2 VISIT EXPERIENCE

6.2.1 Outline of the data collected

This section examines the experience groups had in the museum. The analysis draws on data collected for each group during the visit. A summary of this data is presented in Table 6.3. This table shows that all the groups tweeted while exploring the galleries. Most of the groups took a great number of photos, but not all posted photos online (e.g. Group 2). Moreover, across all the groups the responses in the worksheets were limited.

Regarding the worksheets, these were handed out to the students in the museum and were collected by the researcher in the lesson following the visit (N=17, see Table 6.3). None of the worksheets collected was fully completed, but it is noted that students were aware that it was not compulsory to fill them in (see Section 4.4.6 for a description of the method). All the groups, except Group 6, largely followed the trail suggested in the worksheets. Observation notes indicated that in some groups tasks were divided among members of each group, and as a result only one member of the group was in charge of the worksheet (e.g. Group 3, Group 4, Group 5). Ten (n=10) had a few responses written on them (by four groups). A number of Twitter posts were also responding to worksheets' questions and will be highlighted in the analysis that follows. Moreover, events drawing on video data, as well as observation notes offer some insights into how students used the worksheets. Neither the interviews nor the questionnaires directly addressed the issue of worksheets during this visit. However, in both instruments, students' responses indirectly revealed perceptions regarding the use of worksheets and the findings from these instruments will be discussed in Chapter 7 (Section 7.3.4 and Section 7.3.5).

Table 6.3 Outline of the data collected during the museum visit

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Tweets	15	11	5	14	11	11	11
Tweets in galleries		9	5	11	10	7	8
Photos on Twitter	7	-	2	-	3	-	2
Photos on iPhone	30	73	44	11	53	31	14
Notes on iPhone	-	-	-	5	-	-	-
Videos on bus	2	-	2	3	4	4	3
Worksheets collected	4	2	1	1	2	4	3
Responses in Worksheets	-	-	-	1	1	8	4
Tweets responding to worksheet	1	1	-	8	2	8	4
Observation data	-	-	video	notes photos	notes photos	-	-

For each group the documentation of its visit was a series of events based on the objects-in-focus and interpretive resources provided by the museum, alongside data generated by the students. Diagrams of the routes that the groups followed and transcripts that were drawing on multiple sources of data were created for each group. For three groups, in particular (i.e. Group 3, Group 4, Group 5), the analysis could be conducted in greater detail due to rich observation data (see Table 6.3). Especially for Group 3, for which video data was available, the documentation of their visit was carried out based on the method suggested by Ash (2007) (see Chapter 4, Section 4.5.4.1).

The following section draws on this documentation and, in line with the aims of the thesis, presents a few representative events that highlight the main points emerging from the data.

6.2.2 Group formation and distribution of roles

Analysis of the data indicates that the original group formation, assigned by the teacher, was largely kept during the visit (see Appendix B, Table B1). However, for Group 5, Observer A reported that in certain parts of the visit the group was split into two subgroups (i.e. boys-girls). It seems that the boys were browsing in the same space as the girls—illustrated by the observer’s photos—but they were not together at all times. Photos indicate that a similar split took place for Group 7. This might be related to social dynamics among the children.

Regarding the distribution of roles within the groups, the analysis points to some groups having specific students in charge of the iPhone throughout the visit (Group 1, Group 4, Group 5, Group 6). In particular, observation notes show that Group 4 had a clear distribution of roles: one student (i.e. Neil) was in charge of the iPhone and the one contributing tweets, while the other two had the digital recorder and the worksheet respectively. In the same group, one student (i.e. Darren) was reading the activities out loud and in no particular order and then, they were all trying to identify or select objects. Another example is Group 3, for which video data shows that the iPhone was used interchangeably by all members of the group. Even in the case of Group 3 though, one member was largely coordinating their activities (i.e. Kevin) and another one taking photos (i.e. Adele) (see Appendix B, Table B6 and Table B7).

6.2.3 Agenda/Theme of the Visit

Regarding the agenda of the visit (i.e. ‘civil rights’), examination of the data revealed a diversity in groups’ approaches and three different types of visit experience emerged.






These were: ‘floating’, ‘hybrid’ and ‘focused’ visit experience (see Section 6.3.2 for a discussion about the terms). The three types will be discussed in light of the data collected.

‘Floating’ Visit Experience

The data generated by Group 1, Group 2 and Group 3 gave no strong indications that they were following the agenda of the visit. The groups saw a number of objects—illustrated by the high number of photos captured (see Table 6.3). They contributed content on Twitter (see Appendix B, Table B4) and got engaged in discussions around artefacts, but no data relevant to ‘civil rights’ was generated. There were indications that members of Group 1 were aware of the topic-in-focus and they attempted to contribute content around this. However, evidence in the data collected by this group suggests that the students shared only a vague understanding of the subject. In particular, two of their tweets referred to suffragettes, yet the links included on the tweets depicted photos from the World War II (see Appendix B, Table B4, tweets t36 and t40). This is also reflected in the pictures captured by Group 1, i.e. among the thirteen photos taken in the War Display, seven depicted women. This misconception was apparent in the post-visit lessons as well (i.e. in the production of collage), as will be shown in Chapter 7.

The Example A that follows presents a Significant Event (SE) based on Ash's (2007) approach to video analysis (see Section 4.5.4). It was the only event from Group 3 associated with the theme of the visit (see Appendix B, Table B7). The example demonstrates that despite seeing objects related to ‘civil rights’, this was neither acknowledged in their interaction nor in the data generated by the students.

Table 6.4 Example of a ‘floating’ visit experience (Group 3)

Events	Flow Chart II: Photo Album and Black Panther Image			
Object-in-focus				
Name	Photo Album and Black Panther Image			
Description (by MoL)	Print (paper) Maker: Neil Kenlock Date: c.1970			
Video Stills	 A. 02:00	 B. 02:07	 C. 02:14	 D. 02:28
Photos				
Verbal Interaction	<p>K: This is like, like... Wait, what's this?</p> <p>➔ <u>A. stops at the album, K. questions what it is & attempts to name it</u></p> <p>A: We are supposed to touch this?</p> <p>➔ <u>A. hesitates to touch the album - seeks a second opinion.</u></p> <p>K: Yeah... <i>(both of them turn the pages of the album. H. & R. join)</i></p>	<p>K: Wait! Is this the... Black... or something?</p> <p>➔ <u>K. makes an inference. Interpreting images and introducing a topic. Mainly addressing H.</u></p> <p><i>(All stare in the image in front of them - see Still B)</i></p>	<p>H: This is about Black people () <i>(A. & H. turn pages)</i></p> <p>➔ <u>H. interprets and amplifies</u></p> <p>K: Like you... <i>(Heather looks at him)</i></p> <p>...I mean into our country</p> <p>➔ <u>K. assumes/ identifies relevance with H. H. seems to question intentions. K. corrects his expression.</u></p> <p>H: Black people like meeee, you know! A couple from knowing you...</p> <p>➔ <u>H. sarcastic. Disengaged. H. shifts focus & looks at the album. K. moves in the back (see Still C)</u></p>	<p>K: Oh, ok, alright! So this is when... their rights started coming in, like muslims?</p> <p>➔ <u>K. realises his comment was not received well. Re-interprets the topic, but gets no response</u></p> <p><i>(A. and K. head into the Changing London)</i></p> <p>K: Heather should know this. I, I don't know...</p> <p><i>(H. is still by the album - see Still D)</i></p> <p>➔ <u>K. insists that H. as a black person, should know about the topic. Justifies his ignorance.</u></p> <p>A: Adele K: Kevin H: Heather R: Rachel</p>
Tweets/ Notes/ Worksheets				

Example A Photo Album

Group 3 [Video Data 01:50-02:35]

Flow Chart I - Event: Photo Album (Appendix B, Table B7)

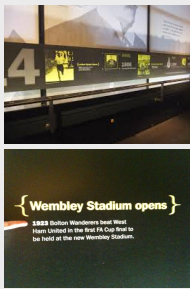








The three members of Group 3 stopped by the photo album in the ‘Race and Rights’ section of the World City Gallery. A part of their interaction is shown in Table 6.4, while the function in context as in Ash’s method (2007) is also provided (i.e. underlined).

Two main points arise from this example: the first, Kevin's wonder about whether the item in front of them is the ‘Black Panther’ (the ‘Verbal Interactions’ row, 2nd Column). Since he had not seen this item before, it is argued that his guess is due to him having seen others posts on the Twitter stream. Second, the utterances indicate that Kevin assumes that a ‘black identity’ exists, which presumably Heather, as Black British, has. Kevin, further, thinks that Heather should be knowledgeable about this topic (the ‘Verbal Interaction’ row, 3rd Column). Therefore, as soon as Heather joins in the group, he specifically directs questions and comments to her. Kevin looks rather puzzled with this exhibit, hence, he might be expecting Heather to support him in gaining a better understanding on the topic. However, his comment “like you...I mean into our country” is viewed negatively by Heather and seems to disengage her from the interaction. Heather repeats Kevin’s comment in a sarcastic tone and shifts her focus from the interaction to the photo album.

‘Hybrid’ Visit Experience

The second type of visit experience revealed in the data analysis was the ‘hybrid’ visit. For three more groups (Group 5, Group 6 and Group 7) there was evidence to suggest that to a certain extent, they were following the visit plan. They saw objects related to ‘civil rights’, contributed tweets relevant to the theme, but they also contributed tweets that were off-task. For example, in Table 6.5 that draws on data from Group 5, the tweets t24 and t27

Table 6.5 Example of a ‘hybrid’ visit experience (Group 5)

Events	1st	2nd	3rd	4th	5th	6th
Object-in-focus		 ©Museum of London	 ©Museum of London	 ©Museum of London	 ©Museum of London	 ©Museum of London
Name	Timeline	Taxi	Sash, Badges and Jewellery	Nurse's Uniform	Replica Dial Telephone	Fashion Items
Description of objects (by MoL)	<p>1923 Wembley Stadium opens.</p> <p>Bolton Wanderers beat West Ham United in the first FA Cup to be held at the new Wembley Stadium in London.</p>	<p>This is one of London's earlier motorised taxis. The 1st petrol-driven taxi appeared on London's streets in 1903...Motor vehicles changed the look, sound and smell of London's streets...but more noise, greater speed and danger for pedestrians</p>	<p>Suffrage organisations used colours, symbols and logos to promote their message. Members of the Women's Social and Political Union were expected to wear purple, white, and green to all public events. 1908-1910</p>	<p>This uniform was worn by Kathleen Falls. The terrible slaughter of WWI helped recruit many women in the medical profession 1914-18</p>	<p>Pick up the telephone receiver and listen to memories from people when the telephones were a luxury. Find out what people thought of this new invention...</p>	<p>Hand-printed cotton coat, 2003. Designed by Eley Kishimoto (Date: 2003)</p>
Photos on Twitter by Group 5						
Tweets	<p>t17: Can't find the peoples city lol we r lost (t17)</p> <p>t18: Learn something new every day wembley stadium was opened 1923</p>	<p>t19: http://yfrog.com/h23rovpi dat a taxi</p>	<p>t24: Looking at the suffragette badges and pins the ones they wore this to fight for their rights brave women</p> <p>t27: http://yfrog.com/h4ftepdj</p>	<p>t35: #muvi1 I think the war really helped women get independence so u go girls lol</p> <p>t39: @Sara who had to fight ?</p>	<p>t48: http://yfrog.com/h7wtlnlwj</p>	<p>t56: Looking at all the fashion in the 70s it was actually quite good</p>
Notes/Worksheets						

referred to specific artefacts members of this group were looking at (i.e badges and

jewellery) and were related to the agenda of the visit, in contrast to tweets t19 and t48 that

provide a link to a taxi and a telephone respectively. This table, similar to transcripts created for Group 6 and Group 7, illustrate that these three groups had partly a focused visit. What is more, direct replies posted by the three groups provided some indications that the students were reading the Twitter stream (see Figure 6.3, tweet t39). This point is further verified by interview data in Chapter 7.

‘Focused’ Visit Experience

The data analysis pointed to Group 4 as the one largely following the plan of the visit and using the worksheet to contribute content on Twitter. This group was followed by the researcher (i.e. observer). In the galleries, the researcher repeated the instructions given to all in the e-learning studio, i.e. explore the three galleries, contribute content to address their inquiry, be aided by the worksheet. Example C in Section 6.2.4 that follows draws on data collected on Group 4 and shows the students’ engagement with various resources, tools and artefacts in compliance with the aims of the visit.

6.2.4 Engagement with artefacts, tools and resources

This section focuses on specific examples to show how the students were selecting and interacting around museum artefacts. It provides evidence to show how the microblogging and the practice of taking pictures was employed by students and was well integrated in their conduct.

6.2.4.1 Selection of objects




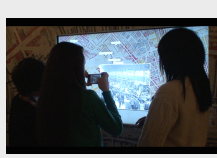
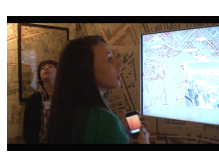



Indications among all groups pointed to the students getting engaged with large scale artefacts or interactive displays, despite not being associated with the visit’s theme, i.e. ‘Booth’s Map’ (n=4 groups) (see Example B); ‘Pleasure Garden’s’ (n=4 groups); ‘Climate

Change Interactive Displays' (n=6 groups). For example, all groups, except Group 4, visited the City Gallery, where an iconic artefact is on display—the Lord Mayor's State Coach (see Example F). Seeing their peers by specific objects (e.g. Group 3, Group 5, and Group 7 in the Booth's Map installation) as well as their personal interests (e.g. Group 3 - Olympic Games, Group 5 - Fashion Displays) appeared to influence their selections. Moreover all groups seemed to be engaged with artefacts in the War Display. This might be an indication that prior knowledge influences choices in the visit. Finally, the students seemed to explore the galleries in a serendipitous matter. Evidence from the video data showed that the members of Group 3 appeared to appreciate the unexpected events, providing evidence for serendipitous browsing and selecting objects that seemed to capture their attention (e.g. see Appendix B, Table B6, Event 'Timeline Handrail', 'Underfloor Cases'). A question regarding selections made during the visit was asked in the post-visit questionnaire (Appendix A, QI) and similar findings to the ones reported in this paragraph were found (see Section 7.4.3).

6.2.4.2 Engagement with museum artefacts

Video data shows that common practices seen in students' encounters with artefacts were pointing to objects, reading out loud words from labels and trying to recall information or express opinions, emotions, and judgements. The following example provides evidence of the interaction the members of Group 3 had in the Booth's Map installation. This event was identified as a 'Promising Event' in Flow Chart II (see Appendix B, Table B7) and is included to show how the photos saved on the iPhone captured aspects of this interaction.

Table 6.6 Engagement with Booth's Map installation (Group 3)

Event	Flow Chart I: Charles Booth's Map			
Object-in-focus	 <p>©Museum of London</p>			
Name	Charles Booth's Map			
Description of objects (by MoL)	<p>Charles Booth's survey was an ambitious attempt to assess the scale of poverty in London. Whereas artists and writers painted emotionally charged pictures of the poor, Booth wanted to map poverty scientifically. His researchers went out into London with the aim of assessing the social character of each street...Booth's map provides an extraordinary snapshot of London at the end of the 19th century.</p>			
Video Stills	 A. 08:50	 B. 09:00	 C. 09:42	 D. 09:55
Photos on iPhone				
Verbal Interaction	<p>A: Let's find my house.. (explores the map) K: What is it? (looks at pictures) (Gr...) street (he changes the picture) H. This is about... K: Oh! Look at the underground stations! (zooms out the picture of Edgware station - see Still A) A: Let's take a picture! H. Let's go. A. Let's close it, I want to take a picture of that poverty</p>	<p>K. Let me show where (Kevin points and Adele takes a picture) Good! H. The blue area is badly poor... D. That would be the O2 (he points to the area). H: The red area is very poor, blue very-very poor (shows areas in the map) H. It's mostly red] A. [Yeah H. Look at how much red is there (points to the map - see Still B) A. Yeah, that's middle class K. And that's all by the river as well, all by the Thames. A: And that's the () (she points to an area) This...(underworld!) (points to South London)</p>	<p>K: Paddington station (they check photos) H: Woohoo!! A: Let's look at the pictures K: Have you seen this one? (shows the info for Paddington station) A.Oh, that's alright (she changes the picture) K. Paddington station in 1900... (reads the info) A. Ohhh...ugly people... (she takes a picture - see still C) K: Heh heh heh</p>	<p>A. I like taking pictures...Oh look, its all over (they look at the ceiling - see Still D) It's cool K: It's so big A: I like the () K: Oh Lord, it's on the floor as well (they look at the floor and walk out of the installation)</p> <p>A: Adele K: Kevin H: Heather</p>
Tweets/ Notes/ Worksheet				

Example B Booth's Map

Group 3, Booth's Map Installation [Video Data 07:56-10:26]

Flow Chart I - Event: Booth's Map (Appendix B, Table B6)

The video data showed that Group 3 spent more time in the Booth's Map Installation than in any other exhibit, although it was not related to the theme of the visit. During the interview, when asked about things he learnt, Kevin referred to the Booth's Map installation (see Section 7.3.1). Table 6.6 shows the interaction the three students had around this artefact.

In particular, video data shows Adele and Kevin, and to a lesser extent Heather, engaged with features of the installation, such as maps and images. Students were discussing about specific images (e.g. Paddington station), drawing on information provided in the display or on their prior-knowledge to make sense of the map (e.g. O2 Arena). They were also integrating features of the installation (i.e. colour coding) to talk about poverty in relation to social classes in London. They took three pictures that they considered as representing notions such as 'poverty' or 'ugliness' (see the 'Photos' row). The statement "I like taking pictures", expressed by Adele (see the 'Verbal Interaction' row), might explain the large number of pictures taken by this group (n=44).

6.2.4.3 Use of the worksheet

The following example focusing on Group 4 illustrates how the worksheet was used as a resource to find objects and to contribute content online. This group contributed content on Twitter, captured photos and made some notes in the Notes application on the iPhone. Example C demonstrates the focused nature of their visit.

Example C Use of the worksheet in the galleries

Group 4, People's City Gallery and World City Gallery

The students followed the trail suggested by the worksheet (see Fig. 6.4), therefore they saw the suffragettes' display, as well as on objects related to black civil rights. Table 6.7 provides the transcript of their activity in the People's City and World City Galleries.

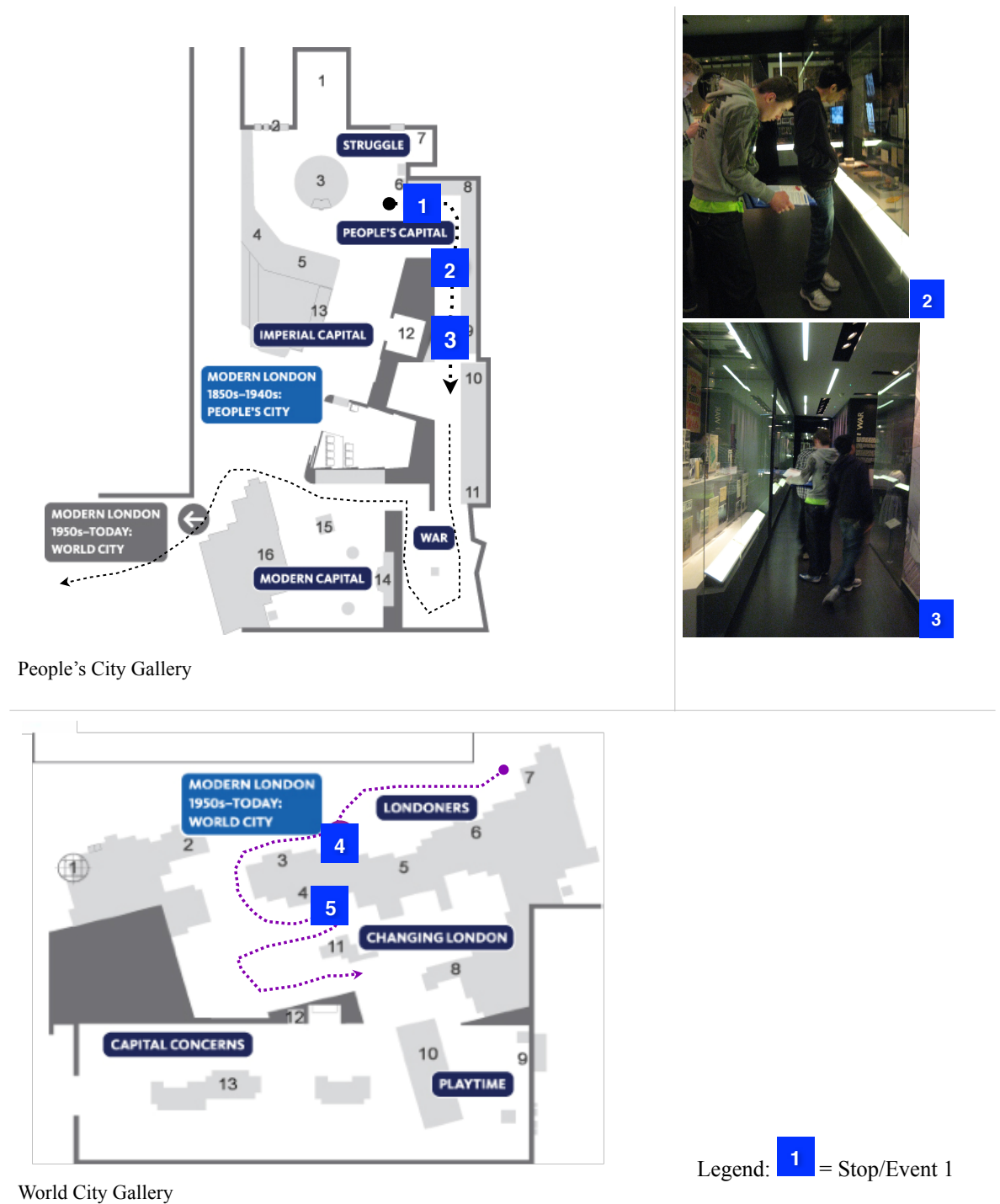













Figure 6.4 Trail followed by Group 4 in People's City and World City Galleries

Table 6.7 Example of a ‘focused’ visit experience (Group 4)

Events	1st	2nd	3rd		5th	
Object-in-focus	 ©Museum of London	 ©Museum of London	 ©Museum of London	 ©Museum of London	 © Neil Kenlock	 © Neil Kenlock
Name	Belt and Padlock	Hunger strike & prison medals	The Suffragette	Banner West Ham W.S.P.U	Black Panther	Photo Album
Description of objects (by MoL)	Suffragettes chained themselves to the railings of government buildings. They knew the police were unwilling to place their hands under clothing to release padlocks and chains Date: 1908-1914	Militancy and imprisonment was rewarded through presentation of medals. Hunger strike medals were given to those who endured the ultimate form of prison protest. Date: 1908-1909	Copy of the Suffragette newspaper. Date: 1.11.1912	Banners in demonstrations brought the <i>Vote for Women</i> to a mass audience. This example includes Sylvia Pankhurst's <i>Angel of Freedom</i> symbol Date: 1909-10	Print (paper) Maker: Neil Kenlock Date: c.1970	Graffiti, Balham Print (paper) Maker: Neil Kenlock Production Date: 1972
Photos on iPhone						
Verbal Interactions					“this is a protest, not positive for her” (Neil)	
Tweets by Group 4	t23: #muvi2 the suffragette method was peaceful, posters are a method of protest. This appealed more to lower class as it was in every day life t29: #muvi2 in this exhibit there are many tools of that they used for protest e.g. huge chain belt. Small hammer's 4 smashing window's and more		t42: #muvi2 the violent method of the suffragists was a spark which got more people involved while posters were more long term	t46: the films are very useful because it showed us a visual impact than reading information t49: #muvi2 the phrase is Courage Constancy & Success!	t63: #muvi3 A British black panther demonstration, Brixton, 1970	t64: #muvi3 the protest with the 'keep Britain White' this is a protest not a good one but someone is still trying to say something

Notes on iPhone by Group 4	1.Belt and padlock 1a.Women placed this object unsure [under] there [their] clothing as they knew that the police wouldn't place their hands under clothing to release padlocks and chain 1b.I think that this method of protesting was to [too] much but it also showed women strength for stuff no matter what gender they are.	5.Emelie Pankh. 1914 window breaking as it was a crime for women to be window breaking 6.mostly all as they all did an effort to make it effectible [effective] http://yfrog.com/gyg26sdj			
Worksheet					Brixton, 1970

The tweets and the notes saved on the iPhone are all responses to the tasks in the worksheets. Their notes were drawing on labels they read (e.g. Table 6.7, 1st Event, Note 1/Description by MoL). However the notes cannot be considered as part of the online discourse, since they were not uploaded on Twitter. Further to this, no photos were uploaded online by Group 4, which may be due to a network problem they had in their first attempt to upload a photo.

Most of the photos (n=8) saved on their iPhone were also seen as responding to worksheet prompt, e.g. “Find an object that shows women’s favourite colours” (see 2nd event). Regarding the tweets posted in the galleries (the ‘Tweets’ row) they represent objects selected by this group or discussed face-to-face and are responding to worksheet prompts. For example, tweet t49 was a response to the question “What would you suggest as a slogan for the suffragettes’ campaign?” and included the slogan ‘Courage, Constancy and Success’, which was seen on the West Ham W.S.P.U Banner in the Suffragettes’ display (see Table 6.7, 3rd Event).


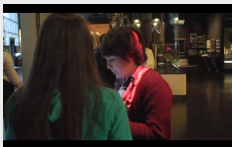
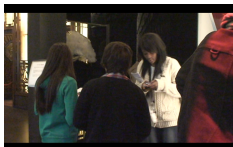
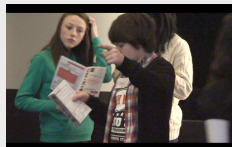
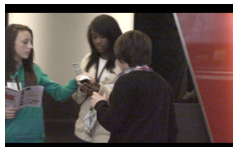

Tweets t23 and t42 reflected a face-to-face discussion students had about violent methods as opposed to peaceful methods in suffragettes' practices. In both tweets, the pupils drew on prior knowledge and differentiated between suffragettes and suffragists based on the nature of their protest. By drawing on museum labels (see the 'Description by MoL', 3rd Event), they attributed characteristics to posters such as 'peaceful', 'long term' and 'appealing to lower classes' to give arguments for and against the methods. These were seen as a response to the prompt "Pick up one type of protest and give two reasons for and against going to this extreme as a form of campaign". Finally, tweet t64 reflected an evaluation expressed by Neil regarding the photograph by Neil Kenlock (see the 'Verbal Interactions' row).

The students passed through the War section and had a brief stop by the fashion items (Fig. 6.4, Stop 4). Having seen these items, they could later respond to a tweet by Group 5 (see Fig. 6.3, tweet t73) related to the fashion displays (Appendix B, Table B4). Towards the end of the visit an interaction between Neil and the researcher was recorded. Although the student referred to Twitter and its use in the museum with very positive words, he also said that "we really need people like you and our teacher to ask us things and point out things".

6.2.4.4 Engagement with Twitter

The following three examples show how the students were engaged with microblogging. Example D focuses on the idea of 'oriented to an audience', while Example E and Example F highlight the practice of taking photos that proved to be popular among all groups. All the examples draw on video data from Group 3.

Table 6.8 ‘Oriented’ to an audience (Example D, Group 3)

Events	Flow Chart II: First tweet			
Object-in-focus	 ©Museum of London			
Name	Nurse's Uniform			
Description (by MoL)	This uniform was worn by Kathleen Falls. The terrible slaughter of WWI helped recruit many women in the medical profession. Date: 1914-18			
Video Stills	 A. 17:24	 B. 17:52	 C. 19:13	 D. 19:18
Photos on iPhone				
Verbal Interaction	<p>K. Alright, tweet some photos. Alright, pick a photo that you think it was quite good from going around there...</p> <p>→ <u>K. introduces a task and frames how to execute it.</u></p> <p>(A. starts walking, K. follows and both join H. All stand by the cinema)</p> <p>→ <u>A. hesitates</u></p> <p>K: Heather, pick a photo in here that you think it was quite good from going around that one and just say ‘WOW, look at this thing which is over there’</p> <p>→ <u>K. reassigns the task. Adds a script.</u></p>	<p>H: Do that? (H gets the iPhone from A. and starts typing - see Still B)</p> <p>→ <u>H. puts herself forward and resolves the tension.</u></p> <p>K. Yeah...do that and then just say like ‘Wow, look at...’</p> <p>→ <u>K. approves and repeat instructions</u></p> <p>H: Look at the () (laughs)</p> <p>K: (laughs) Say ‘20s</p> <p>→ <u>Both respond to H’s joke with laughter. K. refers to content.</u></p>	<p>A: Is this done? Is it done? → <u>A. inquires</u></p> <p>H: Yeah...Used to...</p> <p>→ <u>H. responds affirmatively</u></p> <p>K. That’s People’s City and the next place we need to go to is... (K. looks at the worksheet) ...Expanding City.</p> <p>K: Ok, the next one is down there (K. points to the direction - see Still C)</p> <p>→ <u>K. gives orientation cues for next task</u></p>	<p>K: So, have you done it? (talks to H.)</p> <p>→ <u>K. seeks for confirmation that task is executed</u></p> <p>H. Yeah... (A. gets iPhone back - see Still D)</p> <p>→ <u>H. responds affirmatively</u></p> <p>K. Then tweet it!</p> <p>H. I tweeted...</p> <p>A: Adele K: Kevin H: Heather</p>
Tweets	t41: Woke [Wow] look at what the nurses used to wear around the 1930's			

Example D Oriented to an audience

Group 3 [Video Data 17:20-19:38]

Flow Chart II: Selfridges Lift/Cinema - First Tweet (Appendix B, Table B7)

This significant event (Ash, 2007) took place right after Group 3 finished the exploration of the People's City Gallery. Contributing content on Twitter for the first time was a task introduced and coordinated by a specific member of the group from the inception until the execution (i.e. Kevin). A portion of the dialogue is shown on Table 6.8, alongside the function in context as in Ash's method (2007) (i.e. underlined).

The analysis of their interaction shows that Kevin is intrigued with the idea that they should be posting their highlights of their visit. In other words, objects or images that would appeal and have a 'wow effect' to people who will read their posts. Indeed, he uses the term 'wow' twice (see the 'Verbal Interactions' row). There was no indication in the video data about who takes the decision to tweet about the 'Nurse's Uniform' that the three students had seen earlier in this gallery. While typing the tweet, Heather and Kevin have an exchange about dates, and indeed a date was included in their tweet. What is more, Kevin's suggestion was taken on board and the tweet started with "Wow, look at...". Beyond this, the interaction in Table 6.8 (3rd column) gives evidence that Group 3—contrary to Group 4 earlier—used the worksheet for orientation purposes rather than for assisting them in organising their activity around objects in the galleries.




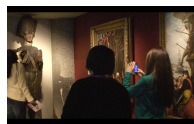
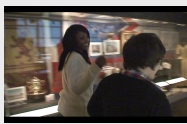

Example E Posing by Artefacts

Group 3, Tobacconist's shop sign [Video Data]

Flow Chart II - Event: 'Heather's found new love' (Appendix B, Table B7)

Many photos collected during the visit depict students posing by artefacts. For example, twelve out of thirty-one photos taken by Group 6 show its members posing by artefacts.

Table 6.9 Posing by artefacts (Example E, Group 3)

Events	Flow Chart II: Heather's found new love!			
Object-in-focus				
Name	Tobacconist's shop sign			
Description (by MoL)	A Scottish Highlander figure stood at the door of many London tobacconists, signalling that snuff (a powdered tobacco snorted up the nose) was sold there. The Highlander was usually shown holding a snuff mull of horn in the left hand and a pinch of snuff in the raised right hand. Snuff was very popular among Scots, especially those from the Highlands (circa 1800)			
Video Stills	 A. 27.26	 B. 27.44	 C. 27.49	 D. 28.07
Photos on iPhone				
Verbal Interaction	<i>(H touches the statue & takes various poses - see Still A)</i>	<p>H. Take a picture of me, I'm in love with him!</p> <p>➔ <u>Heather introduces a task and justifies it</u></p> <p>A. OK <i>(Adele takes a picture, Kevin observes)</i></p> <p>➔ <u>Adele agrees. Heather poses</u></p> <p>K. There you go!</p> <p>➔ <u>Kevin overviews the execution</u></p> <p>H. Tweet that!!! <i>(Heather laughs)</i></p> <p>➔ <u>Heather adds another task</u></p>		<p>K. Oh, Heather's found new love!</p> <p>➔ <u>Kevin frames the activity</u></p> <p>H. Yeah... <i>(points to K. & laughs - see Still D.</i> <i>They all laugh.</i> <i>A. posts a tweet)</i></p> <p>A: Adele K: Kevin H: Heather</p>
Tweets				t62: Heather's found new loove!!
Notes/Worksheet				

The example below draws on video data and describes a significant event (Appendix B, Table B7) where a member of Group 3 poses in front of a ‘Scottish Highlander’ figure. In Table 6.9 a portion of the actual dialogue is shown, as well as the function in context as per Ash’s (2007) method (i.e. underlined).

Early in this event Heather left the other two who were engaged in a discussion around two iconic Victorian paintings (see Flow Chart I, Appendix B, Table B6) and started looking at and touching the statue displayed on the side of the paintings (see Still A). She realised that Adele was taking a photo of a painting and she grasped this opportunity to ask Adele to take a photo of her by this figure, since she claims to be “in love with him” (Table 6.9, the ‘Verbal Interactions’ row). Heather is posing and afterwards she asks Adele to tweet this. Kevin, being an observer here, frames the activity as ‘Heather found new love’. Adele uses this exact phrase in the tweet posted (tweet t62), but attached no picture to it. This tweet (t62) got a direct reply from Group 6 (t65: “lol Adele xx”), who seem to have found the tweet amusing (see Fig.6.3).

Example F Taking and uploading photos on Twitter






Group 3 [Video Data]

Flow Chart II - Event: Lord Mayor’s Coach (Appendix B, Table B7)

This significant event took place in the City Gallery, where an iconic item is on display, i.e. Lord Mayor’s Coach. Table 6.10 shows a portion of the actual dialogue is shown, as well as the function in context as per Ash’s (2007) method (i.e. underlined).

The students seemed impressed with the coach and immediately Kevin suggests taking a photograph of it. Their first guess is that this is the Jubilee Carriage, possibly drawing on

Table 6.10 Taking and Uploading photos on Twitter (Example F, Group 3)

Events	Flow Chart 1: City Gallery - Lord Mayor's Coach		
Object-in-focus	 <p>©Museum of London</p>		
Name	The Lord Mayor's State Coach		
Description (by MoL)	<p>In April 1757 Sir Charles Asgill, knowing that he would become the next Lord Mayor, persuaded the City's aldermen to give money for a 'New Grand State Coach'. The coach was ordered from Joseph Berry of Leather Lane, Holborn, for the fixed price of £860. It was designed by Asgill's architect, Sir Robert Taylor. The state coach was ready in time for the Lord Mayor's procession in November 1757 and has been used ever since.</p>		
Video Stills	 <p>A. 10.05</p>	 <p>B. 10.53</p>	 <p>C. 11.16</p>
Photos online			
Verbal Interaction	<p>K: Ohhhhhhhh! Let's take a picture of it. That's amazing. Ohhhhhhhh (they look at the coach, the split, one goes from one side and the on the other side. They re-join)</p> <p>→ <u>K. has an emotional reaction to the object. He invites to undertake a specific task.</u></p> <p>K: What is this? Is this the Jubilee carriage?</p> <p>→ <u>K. questions what the object is and its name</u></p> <p>A: ()</p> <p>→ <u>A. responds</u> (they walk to the back of the gallery - <i>see Still B</i>).</p>	<p>K: Lord, Mayor's State coach. Oh, the mayor used to go in there</p> <p>(K. reads the label out loudly. K. takes a picture - <i>see Still B</i>)</p> <p>→ <u>K. reads label.</u> <u>Provides a re-interpretation of the label</u></p> <p>K: Let's post that on Twitter! Tweet it! (on their way out of the City Gallery)</p> <p>→ <u>K. invites to undertake another action and post the image of the object online.</u></p>	<p>K. Which hashtag? (probably looks at the sign in front of him)</p> <p>.....Changing London.</p> <p>→ <u>K. responds/acts to his own suggestion</u></p> <p>K: What to tweet?</p> <p>A: Where is Heather?</p> <p>K: We've done this bit. Let's go back. (walk in the World City Gallery)</p> <p>A: We haven't seen everything yet. (they join H. by the fashion items)</p>
Tweets			<p>WOW LOOK @THE MAYORS CARRIDAGE ;D http://yfrog.com/h7hh8wj</p>
Notes/Worksheet			

features of the coach (i.e. golden). This changes once they read the label (see ‘Description by MoL’, Table 6.10), also illustrated by their tweet. Next, Kevin takes a picture of the Coach (the ‘Photos Online’ row) and suggests to post this on Twitter. This is the first time the group acknowledges adding a hashtag to their tweets, though not included in the tweet. This might indicate a gradual familiarity with aspects of the visit design. The tweet posted keeps the format suggested by Kevin in Example D (i.e. “Wow, look...”). Later in the visit, this tweet got a direct reply from Group 7. It looks like Group 7 had already seen the coach earlier and were challenging Group 3’s tweet after seeing this post (“Thats the queen carraige you foofl”, see Fig. 6.3).

6.2.5 Analysis of the videos collected on the bus

Short videos were created on the bus after the visit. Students were asked to use a Flip camera and create short videos about their experience in the museum. In total fourteen videos ($K=14$) were created by eighteen students ($N=18$). Many videos ($k=11$) were depicting students either on their own or responding to questions posed by a fellow pupil, while three videos ($k=3$) were presented as interactions among a group of them. Videos are available for all the groups presented in the previous section, apart from Group 2. The videos were transcribed and their content is analysed thematically.

All the students used positive expressions about the visit, such as ‘interesting’, ‘cool’, ‘amazing’, ‘informative’. One student in particular, appeared to appreciate the opportunity given to them to visit a museum, as illustrated by the following: “All was interesting and that we got the opportunity to actually go to a London Museum...” (Heather). A few students ($n=3$) referred to the topic of the visit, e.g. “We learnt about black civil rights and about human rights” (Maria). A few ($n=6$) recalled specific objects, e.g. Nana “about

fashion in the 70s...”, Harriet (via the teacher assistant) the collection of fashion toys, while Tina and Gareth mentioned the videos and interactive displays respectively.

The participants also referred to and evaluated the use of technology (n=5). General comments were expressed, e.g. “I liked the iPhones and what we did” (Nana) or specific, e.g. “I liked the part that we got to tweet... It was good that we get to take pictures and uploaded them on Vuvox” (Kaelan). Regarding the Twitter use, this was ‘enjoyable’ and ‘very interactive with the students’ (Faisal), while practices such as ‘updating’ and ‘sharing’ were mentioned (see Example A-Sara).

Five students (n=5) referred to the museum itself and navigation around its space. Three thought it was particularly easy to find things. By contrast, two others suggested better navigation aids (e.g. Kevin, Sara - see Example A).

Moreover, two videos made references to the design of the activities. Elisa pointed to the worksheet saying it was ‘useful’, while Sara reflected on the experience and highlighted aspects of the design, as illustrated by the following:

I really enjoyed it, it was brilliant way of learning and very interactive and I’m really proud of what we were doing. It was really easy to update everything you were doing and share it with your class. The only negative thing that I could say was a bit better signposting about where to go, because some people got bit lost. It was really about to be independent and to just go with groups, but without really being restricted to one group like in the classroom. It was really a good way of learning and I’m taking a lot from this trip

(Example A Group 6 - Sara)

A criticism expressed by two students (n=2) was related to time, also associated with a

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concern that they might be missing out things. Jack's comment is indicative of this:

I think that the trip was very fun, we had a lot of time to enjoy and look at all the different pictures of the museum... It was fun overall, but we didn't get as much time as I thought we would to see all the things. So, it could improve on that one by making the trip bit longer!

(Example B Group 7 - Jack)

6.3 DISCUSSION - FINDINGS

6.3.1 Overview of the visit

The first part of this chapter provided an overview of the visit, first by providing a descriptive numerical analysis of the tweets and the second, through creating a map of the tweets, combined with an analysis of each of the seven nodes of the map. Each approach contributes important insights into the online discourse generated during the visit, the meanings made and the functions that these online expressions have.

The first approach demonstrates that the participants were engaged with the museum and its collections and to a certain extent with the activities they carried out. All their tweets were related to the museum and its discourse. This is particularly important given that this was a self-directed visit, with young people equipped with Internet connected mobile phones. The second approach shows that representing the online discourse as a visual map offers a useful way to engage, explore and reflect on that data and contributes some key insights into the participants' interactions. The map showed that the exchanges between the users were limited and hence, it suggested that the Twitter stream consisted of group postings loosely bound by the participants' experience at the museum. In other words, the

Twitter stream got more of a character of sum of monologues. Students' participation in the stream could be characterised more by the insertion of their contribution into a ill-structured collection of other students' posts. The lack of multiple exchanges is in contrast to the anticipated expectations when designing the project activities. This might indicate disengagement from the learning task or a difficulty for the group to move towards shared viewpoints. It might also point to groups experiencing some difficulty to move between task and meaning making activities (Rogers et al., 2010).

A reason for this may be that the students were absorbed in their environment and did not see the need to connect with students who were performing tasks in other locations (Rogers et al., 2010). It may also be that the students did not yet have fully developed strategies to negotiate "the rules for participation" (Wells; quoted in Ash, 2002, p.395) within this context. Indeed, the analysis showed how their engagement with the tools and the environment was largely developed in the setting and was also shaped by the technology (also discussed in Section 6.3.2). Finally, one more reason might be the conflict between the written form and oral function of technology-mediated communication (Thomas, 2002). Thomas (2002) refers to the use of an online discussion forum to stress that it is problematic to view it as an alternative to face-to-face interaction "through the sole use of the written form" (p.363). This is due to the face-to-face discourse being interactional in nature, while written discourse is generally transactional in nature. Considering the use of Twitter in the context of this museum visit, any difficulties that may have arose among the participants in interacting with each other online could be explained on the basis of viewing Twitter posts as having both transactional and interactional elements.

That said, mapping of the tweets has certain limitations in interpreting the visit. The most important is that it cannot show any ‘invisible interaction’ taking place with participants reading the tweets and engaging with the content and artefacts, while opting not to post a comment. Indeed, Example A provided indications that Kevin was aware of the ‘Black Panther’ exhibit before encountering the image, despite not acknowledging this online. In fact, research consistently showed that only a small percent of participants actively contributed to the microblogs (Ebner, 2009), while the majority were lurkers. The analysis of the interview data (Section 7.5.3.1) discuss further the issue of ‘invisible interaction’.

In addition to this, the examination of the micro-posts provides evidence that the students could use the technology to capture what was happening in the field (Rogers et al., 2005). Similar to extending class conversations (Junco et al., 2011), Twitter can be seen as extending conversations in the museum. However, the examination of the specific characteristics of the micro-posts reveals that the participants shared interpretations that were not always related to the theme of the visit or inquiry. Some groups have enhanced their tweets with links to images they took in the museum or have made references to specific objects. They were doing all this, without questioning or using a specialised vocabulary for describing objects. A similar finding has been reported in the *QRator project* (Gray et al., 2012). Overall, the issue around the quality of the content generated online has been raised elsewhere (Fitzgerald, 2012).

6.3.2 Visit experience

The second part of this chapter traced the visit experience the groups had, drawing on content generated by participants, alongside video and observation data. It is acknowledged that this analysis is partial in relation to the visit experience that each group

had. Yet, what this analysis revealed is the diversity of experiences students had in the museum. This is not an unusual finding in museum studies (e.g. see Anderson et al., 2002).

In the following section the types of visit experience that emerged from the analysis of this data are discussed. To frame this discussion three terms have been used: ‘floating’, ‘focused’, and ‘hybrid’ (see Table 6.11). The first two terms were employed in Leinhardt et al.’s (2002b) diary study. The researchers referred to patterns among the purposes of a visit and used the term ‘floating’ to describe a visitor who was open to whatever the experience might have to offer, i.e. almost aimless to introspective or social. They also used the term ‘focused’ to describe the purpose of the visit as ‘intensely intellectual’. Even though Leinhardt et al.(2002b) looked at the museum as an informal learning setting, these two terms are framing nicely the types of visit identified in the analysis. The section below summarises this finding.

Types of visit

The analysis showed that Group 4 largely followed the visit design and responded to a large number of the activities. The worksheet was used throughout the visit, the distribution of tasks was very clear among its members, a small number of photographs were captured and overall, their online participation was substantial. For these reasons Group 4 is representative of a ‘focused visit’. It might be argued that having the opportunity to hear the instructions twice, first in the e-learning studio and later in the galleries, had an impact on the students’ focused approach. However, I would argue that it largely depends on individual members taking responsibility and initiatives—also observed in other groups (e.g. Kevin in Group 3, Nana in Group 5). Similar to the central role a team leader plays in orchestrating and guiding the students’ task-related and sense-making

activities (Rogers et al., 2010), it could be argued that specific students were micro-orchestrating the engagement with the environment and the technology within their groups. Evidence from observation data suggests that Group 4's tweets reflected face-to-face interactions, even though in several occasions, they echoed Neil's voice. Yet, the analysis demonstrated that Darren or Keith's selections were considered and discussions all had influenced the content. Finally, Neil's comment to the researcher in the end of the visit that a teacher (or adult) is still necessary might indicate a concern that due to the format of the visit important information or objects were missed. Therefore, although the students liked sharing and reading their peers' contributions, they might also welcome having voices of some 'authority'—of specialist knowledge—that would allow them to learn more about objects.

The analysis also shows that three more groups (i.e. Group 5, Group 6 and Group 7) partly responded to the visit theme and design, and partly had an open approach to what the visit had to offer. These three groups, to an extent, followed the plan and responded to a few activities: they contributed content online, which reflected engagement with objects, and had encounters with objects related to the topic of the visit. It looks like personal interests impacted on their selections of objects and overall visit experience (i.e. fashion items), which is also reflected in their tweets and the photographs captured on their iPhones. In these groups the distribution of tasks was clear among its members. Yet, a tension in relation to group formation was observed in Group 5 and Group 7 (i.e. two subgroups). Splits in groups are a regular observation in museums (Allen, 2002). These three groups are representatives of 'a hybrid visit' (Table 6.11).

Finally, Group 1, Group 2 and Group 3 did not seem to have responded to the theme of the visit. Although they contributed content online - all from responses to encounters they had with specific objects - these were not responding to proposed activities. These groups had a large number of pictures captured on their iPhones, with Group 2 specifically the highest number among all groups. However, evidence from Group 1 show that their understanding of the concepts is limited. Drawing on Group 3, in particular, it was evident from the video analysis that the three students experienced the museum in an informal way. Indeed, they were ‘open’ to what the visit had to offer to them and, notably, they showed commitment in exploring the galleries. They also seemed to have a vague idea of what their tasks were, especially with regards to the theme of the visit. For these reasons, these groups are representatives of the ‘Floating Visit’.

Table 6.11 Types of visit experience

Type of visit	Characteristics	Groups
Floating	<ul style="list-style-type: none"> • open to any experience • vague understanding on what they were meant to do in the museum • not following the agenda of the visit • engagement around objects • use of technologies to contribute content 	Group 1 Group 2 Group 3
Hybrid	<ul style="list-style-type: none"> • open to any experience • vague understanding on what they were meant to do in the museum • partly following the agenda of the visit • use of technologies to contribute content relevant or not to the theme of the visit 	Group 5 Group 6 Group 7
Focused	<ul style="list-style-type: none"> • a clear purpose of what they were meant to do in the museum • following the agenda of the visit • use of technologies to contribute content relevant to the theme of the visit 	Group 4

Overall, it is noted that students seemed to perceive their visit experience positively. This is demonstrated by the short videos they created after the visit. This will be further verified by data discussed in Chapter 7.

Engagement with tools and artefacts

Many of the examples provided in this chapter related to Group 3's activity in the museum, hence the discussion here largely draws on the findings arising from the video analysis.

The analysis showed that certain exhibits attracted and held students' attention, e.g. 'Lord Mayor's State Coach', the 'Booth's Map'. This might be explained by the fact that large-scale objects or exhibits associated with kinaesthetic and/or tactile experiences have a strong attracting and holding power for children (Anderson et al., 2002). Engagement in specific objects may be also explained by the fact that some objects are viewed as lending themselves naturally to social experiences, hence they are facilitating exchanges among those who encounter them. Simon (2010) terms these as 'social objects'. In other words, the physical and symbolic features of objects "offer opportunities for certain types of interactions and constrain others" (Achiam et al., 2014, p.475) and may explain why and how students engaged with each other around specific objects.

The analysis showed that despite having a 'floating' visit experience, the members of Group 3 were engaged in discussions related to their encounters with objects and contributed to the online discourse. However, the lack of evidence to suggest that the group was aware of tasks, their inquiry or the overall theme of the visit was a striking finding (see Example A). Video data did not provide any indications to address this issue. On the other hand, Example D and Example F showed that Twitter was seen as providing the tools and an audience for Group 3 to create and distribute interesting content. This is related to Crook's (2012a) 'publication' practice, discussed in Chapter 2 (see Section 2.1.1). Further, it seems that microblogging gave them someone to talk to about their experience (Fischer, 2007). Viewing the group's activity in the museum in light of this perspective, it could be

argued that the students had indeed worked within this frame. However, the fact remains that a tension—also observed in other groups—was created between what the students were asked to do and what they actually did.

This tension might have been the outcome of some students viewing the purpose of the visit ‘through the lens’ of some established informal practices associated with the use of Web 2.0. As emphasised by Falk (2006) “the visitor, not the institution, drives the visitor’s experience in the museum” (p.161) and as such, students’ perceptions around the Web 2.0 tools might have influenced their perceived value during the fieldwork. The tension further might be related to time constraints in the field, a factor discussed by Kisiel (2006) and Meek et al. (2013). Their workload (Rogers et al., 2010), associated with the multiplicity of roles the students had to take, might have challenged the students in conducting parts of the fieldwork. In hindsight, the students needed more support whilst in the field, also stressed by Scanlon et al. (2011). Had this been greater, e.g. better communication around the tasks, more opportunities for *in situ* learning might have been created.

With regard to strategies adopted in engaging with objects, the analysis shows that students were drawing on personal experiences and prior knowledge, as well as on resources provided by the museum to find out more information, which are practices all well documented in the literature (see Allen, 2002). They were also ‘documenting’ the visit through photographs and live-updates on Twitter (Ebner et al., 2010). Drawing on Wankel (2009), the ‘live-tweeting’ may have encouraged careful listening, paying close attention, and gathering information. ‘Live’ communication *in situ* was stressed in the interviews and is discussed further in Chapter 7. Further to this, taking photographs proved to be very popular among the participants, and similar to other studies (Walker, 2008; Vavoula et al.,

2009) a tendency to capture many photos is reported. The data collected also pointed to the practice of posing by artefacts—shown in Example E— which relates to ‘posing’ in an art gallery as a unique meaning making activity, as explored by Steier (2014).

Regarding tweeting, the video analysis showed that by the end of the visit the use of Twitter became a practice well integrated in their overall experience of Group 3. For example, in contrast to the first tweet posted which involved all the students being still in a specific spot (see Example D, Table 6.8), students were ‘on the go’ while posting the last tweet (see Example F, Table 6.10). What is more, the first tweets did not include a photo attached to them, in contrast to the last two tweets. This evidence also points to skills associated with the use of the tools in this context being developed in the setting (Coughlan et al., 2011). Finally, despite Kevin coordinating most of the events, crafting the tweets was a collaborative process, e.g. Heather and Kevin discussed about which date to include in the first tweet (see Table 6.8).

Use of worksheets

The use of worksheets during this visit fulfilled the primary aim of allowing different temporalities and spatial movement in students’ exploration of the galleries. Students worked under different temporalities, experienced spaces and encountered objects at different time slots. To an extent, the worksheets were seen as facilitating the organisation of students’ engagement with the exhibits and the technologies (e.g. Group 4) (see Section 4.4.6 for a description of the method).

However, the students could take in the information on the worksheets only partially or even take no notice of it, thus observation data show different approaches in work through

the worksheets. This might be partly due to the limited time for briefing when arriving at the MoL, because the assumption was that students were familiar with what was expected from them. In hindsight, there were some issues with communication during the visit, resulting in students experiencing difficulty in executing the tasks required from them. This was verified by post-visit questionnaire data, which showed that some participants shared uncertainty about how to use the worksheets, although only a few students pointed to the worksheet or the tasks as their least favourite thing in the visit (see Section 7.3.4). In addition to this, due to time-restrictions the worksheets were not fully utilised, i.e. reflection activities and discussion in between the gallery visits were skipped. These activities were intended to address issues of collecting large amounts of data in the museum, as reported in previous studies (Vavoula et al., 2009), as well as enhancing opportunities for reflection in the setting. The lack of time and its impact on strategies teachers use or plan to use during a field trip has been noted in the literature (see Kisiel, 2006).

It was also anticipated that the teacher and the assistants would provide some assistance to the students in the galleries. Interview data with the teacher (see Section 7.3.6) provided some evidence that the teacher, generally, was not keen on using worksheets during a visit to a museum. This might explain her reluctance in briefing the students about it and further, it might be related to what Griffin and Symington (1997) cite that “teachers express vague or limited learning goals for their excursions, concentrating mainly on enrichment or social interaction” (p.775).

6.4 CHAPTER SUMMARY

This chapter provided the analysis of the visit experience. It consisted of two parts: the first part aimed to give an overview of the visit and to examine how this experience was represented and communicated online. The second part documented several events that help illustrate how the technology contributed to the students' experience (RQ1).

The analysis suggested that students were engaged with microblogging (Gao et al., 2012) and used it as part of a range of resources available to them (Kerawalla et al., 2012; Jones et al., 2013). Evidence in this chapter pointed to practices developed by the students in the setting, with the most important being: live-updating from within the galleries, documenting the visit with photos and contributing content that was 'designed' for an audience. Similar to a finding by Hsi (2003), the examples provided showed that the tool motivated the students to try new ways to engage with objects such as posing by artefacts. This chapter further raised the issue of the quality of the content generated to point that the nature of the interactions did not allow the participants to reach an enhanced shared understanding. Finally, the analysis identified three types of visit experience: the 'focused', the 'floating' and the 'hybrid' visit.

The analysis of the post-visit experience that follows in the next chapter builds on and refines these findings. Chapter 7 pays attention to the classroom context to examine whether the visit experience—well documented in Chapter 6—is extended beyond the museum.

CHAPTER 7

CONNECTED EXPERIENCES ACROSS SETTINGS

Chapter 7 focuses on post-visit lessons, which combine and align the learning undertaken in face-to-face sessions with learning opportunities created online. In keeping with the aim of this thesis, this chapter emphasises learner content creation in the classroom context and examines whether artefacts and tools encountered or used during the museum activities inform students' classroom activities and assist in making connections across the settings (RQ2). The analysis looks for evidence of 'connection building' (Littleton & Kerawalla, 2012) of ideas and development of understanding, both collectively and individually.

During the three post-visit lessons the participants were required to use an online platform (Vuvox) to create a presentation to address the inquiry assigned to them in the visit. They were also asked to use Twitter to peer-review the presentations. Data collected during the post-visit phase consists of personal meaning maps, group presentations, post-visit questionnaire data, video data, tweets and observation notes.

The chapter is organised as follows: in Section 7.1 the aims and objectives of the post-visit lessons are outlined. A description of the three lessons is also provided in this section. The analysis of the data collected in this phase of the study is presented in Section 7.2. Section 7.2.1 focuses on the analysis of the data collected from the Personal Meaning Maps,

followed by Section 7.2.2 that focuses on the analysis of students' presentations. Section 7.2.3 involves the analysis of the data from the post-visit questionnaire, while Section 7.2.4 presents data from the interviews. Finally, Section 7.3 discusses the main findings from this analysis and frames the discussion about whether the use of microblogging mediates the students' connections between classroom and museum activities (RQ2). A summary of the key points raised in this chapter is provided in Section 7.4.

7.1 AIMS AND OBJECTIVES OF POST-VISIT LESSONS

The main objective of the post-visit lessons was for students to create a collage (i.e. multimedia presentation) to address their inquiry (see Appendix B, Table B1) and to present it to their classmates. Another objective was to use Twitter as a tool to provide feedback to each other. An overview of the three post-visit lessons in the school is outlined in Table 7.1. In all the lessons, students worked with their visit groups.

7.1.1 Description of the post-visit lessons

7.1.1.1 Lesson 5 - Lesson 6: Work on Collages

The students' main task during Lesson 5 and Lesson 6 (see Table 7.1) was to create a collage to address the inquiry assigned to them in the museum. Preparatory work started in the museum's e-learning studio, where each group was asked to upload to the Vuvox all the photographs taken in the visit. These were also saved by the teacher in a shared folder on the school's server (to be called 'Picture Pool'), which all students could access.

The first part of Lesson 5 took place in the classroom and involved the creation of the exit Personal Meaning Maps (PMMs) (see Section 4.4.5). The participants then moved to the ICT suite, where the teacher outlined their task. The students could use the 'Picture Pool',

notes taken during the visit, the Twitter stream, as well as other resources (e.g. Websites) to complete this task, but no specific roles were distributed to members of the groups about how to approach this task. They were further prompted to prepare an oral speech to go with their collages. The only restriction set was a maximum of nine pictures to be included in each collage.

Table 7.1 Outline of post-visit lessons

Post-Visit Lessons (Study Participants N=26)				
Lessons	Lesson 5 Work on the Collages	Lesson 6 Work on the Collages	Lesson 7 Group Presentations	
Duration	50'	50'	50'	
Topic	<ul style="list-style-type: none"> • Exit-PMMs • Preparation of the Collage 	<ul style="list-style-type: none"> • Preparation of Collage 	<ul style="list-style-type: none"> • Group Presentations • Peer-Review activity 	
Setting	classroom/ ICT suite	ICT suite	classroom	
Groups/ Individuals	individuals/ in groups	in groups	in groups	
Resources	<ul style="list-style-type: none"> • Entry-PMMs • Photos • Data from Twitter • PCs • Vuvox 	<ul style="list-style-type: none"> • Photos • Data from Twitter • PCs • Web • Vuvox 	<ul style="list-style-type: none"> • Presentations • Data from Twitter • iPhones • post-its 	
Data	<ul style="list-style-type: none"> • Observation notes • exit-PMMs (N=25) • Video data (duration: 48') • collages 	<ul style="list-style-type: none"> • Observation notes • Video data (duration: 43'04'') • collages 	<ul style="list-style-type: none"> • Observation notes • Video data (duration: 45') • collages • tweets 	
				<ul style="list-style-type: none"> • Interviews (with N=11 students and the teacher) • Post-visit Questionnaire (N=23)

7.1.1.2 Lesson 7: Group Presentations

The last lesson in the classroom focused on the group presentations. At the beginning of this lesson the teacher asked the students to review the presentations (excluding their own)

and share their review online by using the hashtag #bestcollage. A facilitated discussion by the teacher led to setting a few criteria for the peer-review activity. These were: focus of the presentation, relevance of information and appropriate photos. Each group had an iPhone (in total seven iPhones) and a member of each group logged-into Twitter with his/her account. At the end the students voted for the best collage by raising hands. Figure 7.1 shows Group 5 giving their presentation to their classmates.



Figure 7.1 Example from Group 5 giving a presentation (Lesson 7)

7.2 DATA COLLECTED IN POST-VISIT LESSONS

7.2.1 Data from the Personal Meaning Maps

In total, twenty-five Personal Meaning Maps (PMMs) were collected. In two of them, however, exit-PMM data was missing due to students' absence, therefore these are not included in the total sample analysed (N=23). The analysis of the maps is conducted around four dimensions, i.e. extent, breadth, depth and mastery (Falk et al. 1998) and is presented in the following section. A qualitative analysis of the PMMs was also conducted and is presented in Section 7.2.2.2.

7.2.1.1 Quantitative Analysis of the Personal Meaning Maps

For all the dimensions, paired Student's t-test was performed, and the threshold probability value was set at 0.05. The outputs for all the dimensions are shown in Table 7.2. In the following section the letters N and n are used to indicate the number of students or a subset of the sample respectively, while the letters K and k are used for number of words/concepts in the personal meaning maps.

1. Extent Dimension

The first dimension looked at the extent of a student's understanding, i.e. the number of words a student could generate about the specific concept (Falk et al. 1998). All the words written on the PMMs were included in this first dimension. A paired t-test found that the museum visit enhanced the degree to which the students were generating words to describe their understanding between the entry- and exit-PMMs, $t(22)=5.65$, $p<0.001$. It is noted, though, that in both the PMMs written responses were brief, with students expressing their understanding about 'civil rights' with single words and phrases (e.g. 'equality', 'it means something to you').

Table 7.2 Descriptive Statistics for Extent, Breadth, Depth, Mastery Dimensions (N=23)

	Entry-PMM		Exit-PMM		Difference		t value
	Mean	StDev	Mean	StDev	Mean	StDev	
Extent	15.3	11.3	27.8	17.3	12.5	10.6	5.65
Breadth	2.39	1.27	4.04	1.7	1.65	1.11	7.12
Depth	1.09	0.17	1.47	0.40	0.39	0.43	2.53
Mastery	1.27	0.35	1.7	0.46	0.43	0.44	4.70

2. Breadth Dimension

Further analysis of the vocabulary words/ideas resulted in classifying students' responses into eight categories. Table 7.3 outlines these categories. This was in compliance with the analysis of the second dimension ('breadth') within the framework suggested by Falk et al. (1998). The 'breadth' dimension looks at the range of conceptual understanding and the focus is on the change of the quantity of appropriate concepts utilised by the visitors.

Table 7.3 Conceptual Categories in the Personal Meaning Maps

	Category	Description
1	Awareness/Actions of subject matter/content	References to, and realisations of general and specific things people/individuals can do to impact civil rights movement/issues, incl. actions, thoughts, judgments
2	Examples of subject matter/content	Specific examples related to civil rights movement/issues (e.g. free speech, black rights)
3	Individuals/groups Subject knowledge/content	References to individuals (e.g. Martin Luther King) or groups (e.g. gay people, women) who are related to civil rights movement/issues (incl. positive and negative figures)
4	Organisations/Government/ Institutions Roles	References to names, roles, responsibilities and expectations of governments and organisations as related to civil rights movement/issues
5	Qualities/Features of subject matter/content	A quality, feature or principles regarded as a characteristic of civil rights movement/issues (e.g. equality, fairness, non-discrimination)
6	Social/Political/Cultural Subject matter/content	References to roles of social, political and cultural factors as related to civil rights movement/issues (e.g. laws, racism, war, dictatorship, attitudes)
7	Values/Emotions	References to values/emotions as related to civil rights movement/issues for self or people in general
8	Worldview	References to attitudes toward and beliefs about people, countries or society in general (e.g. human rights)

To classify students' responses in these categories, the first step was to select 'relevant' responses to consider, as suggested by Falk et al. (1998, p.111). 'Relevant responses' were the words/phrases associated with 'civil rights'/'human rights'. The decision to expand the range of appropriate responses and include 'human rights' was made due to the observation

that many words/ideas in the entry PMM ($k=31$) showed overlapping understanding between ‘civil rights’ and ‘human rights’. In total, the number of responses that were considered in the analysis of the breadth dimension was $K=87$ for the entry-PMM and $K=75$ for the exit-PMM. Inter-rater agreement was established for the responses to be rejected with two researchers independently classifying the responses. It was found to be substantial with $\kappa=0.74$. In the few cases where raters disagreed, these were resolved through discussion until mutual agreement was reached.

The second step was to classify the responses into mutually exclusive categories, drawing on the categories suggested by Adelman et al. (2000, p.61). Based on their work, the categories were customised to encompass the participants’ responses around civil rights and were refined in an iterative process (see Table 7.3). Category 1 (i.e. Awareness/Actions of subject matter/content) and Category 2 (Examples of subject matter/content) seem to have overlapping meaning. However, only responses that refer to specific examples (i.e. gay rights, black rights) are included in Category 2. Category 1, on the other hand, is broader and includes responses that refer to the impact on the civil rights movement such as ‘standing up for rights’. Inter-rater agreement was established for the classification of the responses and was found moderate with $\kappa=0.57$. In the cases that raters disagreed, these were addressed through discussion to ensure that the raters shared mutual understanding of the categories (e.g. as in Category 1 and Category 2).

The next step was to note down the number of concepts employed by each student in the entry and exit-PMM. Each student received a score based on the total number of different categories their responses fell into, regardless of the number of responses representing each category. For example, if a student gave one response referring to individuals who are

related to the civil rights movement (e.g. ‘Martin Luther King’) and three responses stating qualities/features of civil right movements (e.g. ‘equality’, ‘fairness’, ‘oppression’), then the resulting total number of concepts was two (i.e. score=2).

A paired t-test found that there was a statistically significant mean difference in the number of categories a student could generate after the visit, $t(22)=7.12$, $p<0.001$. The students, therefore, not only used more words/ideas in the exit-PMM to articulate their understanding of the concept (i.e. extent of vocabulary), but they also employed more conceptual categories to describe the initial prompt. The visit, in other words, had a positive impact on the range of ideas a student was employing to articulate his/her understanding.

The analysis of the extent and the breadth dimensions further revealed some interesting trends, which will be discussed next. Table 7.4 shows the number of students’ responses per conceptual category in the entry- and the exit-PMM. The ‘exit-PMMs’ column is split into two more columns: the first column shows the number of responses added to the entry PMM, while the second shows the total number of responses that appeared in the exit-PMM. Specifically, Table 7.4 demonstrates that most responses in the entry-PMMs were related to defining or describing the concept in terms of a quality/feature or a principle regarded as a characteristic of civil rights movement/issues, e.g. ‘equality’ (Category 5, $k=19$). This practice was less apparent in the responses added to the exit-PMMs (Category 5, $k=9$). In the entry-PMMs students were also giving examples of the concept e.g. ‘freedom of speech’ (Category 2, $k=16$). Again, a limited number of examples were added to the exit PMM (Category 2, $k=6$). This might be due to asking students to review the original map rather than create a new one. A few responses in the entry-PMMs reflected

attitudes towards and beliefs about people, countries or society in general e.g. human rights (Category 8, k=14). It was observed, though, that some words/ideas added to the exit-PMMs (e.g. ‘shocking’, ‘affects more people’, ‘being brave’) provided a clearer sense of students’ feelings and attitudes toward civil rights. It could be argued that, following the visit, students’ written expressions revealed stronger emotion. This is illustrated in Table 7.4 where in the exit-PMMs an increase in the frequency of references to values/emotions related to civil rights movement/issues is noted, e.g. ‘the amount of people that lost there [their] lives to fight for there [their] freedom is shocking’ (Category 7, k=11). This will be discussed further in Section 7.3.1. Similarly, for the category ‘Awareness/Actions of subject matter/content’, an increase in the frequency of students judgments or references to actions of what people/individuals can do to impact civil rights movement is observed, e.g. ‘violent/peaceful way’ (Category 1, k=21). Hence the visit seemed to provoke a greater sense of awareness and appreciation of civil rights issues.

Table 7.4 Conceptual Categories per Personal Meaning Map

Category	entry-PMMs	exit-PMMs		
	Total number of responses (k=87)	Responses added to exit-PMMs (k=75)	Total number of responses (k=162)	
1	Awareness/Actions of subject matter/content	4	21	25
2	Examples of subject matter/content	16	6	22
3	Individuals/groups Subject knowledge/content	13	15	28
4	Organisations/Government/Institutions Roles	10	2	12
5	Qualities/Features of subject matter/content	19	9	28
6	Social/Political/Cultural Subject matter/content	10	4	14
7	Values/Emotions	1	11	12
8	Worldview	14	7	21

Finally, this analysis also revealed the role of the museum content and how it was reflected in students' responses in the exit-PMMs. References to museum content were noted in eleven responses (k=11) across all the conceptual categories in Table 7.3. Such references included either direct associations (e.g. 'something that really means something to you such as the fact that the pins were in such good condition, they were important to them') or more subtle associations to objects students encountered in the museum (e.g. 'Black Right's (linked to) white people with hatred'). The museum content appears to provide a few students with better and more concrete examples to help them demonstrate a more sophisticated understanding of the concept. This point is related to the analysis of the depth dimension that follows.

3. Depth Dimension

Depth is the third dimension proposed by Falk et al. (1998) for analysing meaning maps, and measures the changes in the degree of understanding within each breadth category.

Falk and Storksdieck (2005) state that

increased depth occurs as individuals are able to provide not only more examples within a concept but also better examples and demonstrate a deeper, more sophisticated understanding of a specific conceptual category. (p.753)

The first step, hence, in the analysis of the depth dimension entailed noting the students who had overlapping categories in both the entry-PMMs and exit-PMMs (i.e. repeated conceptual categories across their PMMs). This would allow the researcher to examine whether the understanding within a concept has developed further after the visit. Following this, the second step involved scoring each of the conceptual categories represented by students' responses, on the basis of a four-point scale suggested by Adelman et al. (2000, p.

53) as follows: (1) minimal response, listing only; (2) more expanded response reflecting general/limited knowledge; (3) expanded and more specific response reflecting a fair degree of understanding; and (4) highly detailed and specific response reflecting in-depth understanding.

Across the sample of twenty-three students (N=23) repetitive categories were noted in ten students (n=10). However, all but three students (n=3) had only one repeated category across their PMMs. Apart from the small number of students, all the responses contained relatively little detail. This proved to be a restrictive factor in applying the type of analysis described in the previous paragraph (i.e. scores would be 1 or 2). It was, therefore, decided to examine the depth dimension in relation to the interviewees' responses about their PMMs (to be called interview PMM). The interview PMM was more detailed and provided more scope for this type of analysis. Use of interview data is also part of Falk et al.'s (1998) proposed method of approaching personal meaning mapping, since they interviewed visitors before and after the museum visit.

To undergo this analysis a detailed coding of the interviewees' responses per conceptual category was conducted, based on the coding scheme developed by Falk et al. (1998, p. 119). Coding categories emerged from the data and were refined in an iterative process (see Appendix B, Table B13). Each repetitive category in the responses of the eight interviewees (n=8) in the entry-, exit- or interview-PMMs received a score. For example, an interviewee had the category 'Values' repeated in the entry-, exit- and interview-PMMs. The response in the entry-PMMs received a score (e.g. score 2). A score was also given for the responses in the exit-PMMs (e.g. score 1) and the interview PMMs (e.g. score 2). An average score for the exit- and interview-PMMs was then acquired (e.g. total score 1.5).

The interviewees' mean depth scores before and after the visit (including exit PMM and interview-PMM) were then calculated to determine whether there was a statistically significant mean difference. A paired t-test found that the museum visit led to a significant change in the depth scores between the entry- and exit-PMMs, $t(7)=2.53$, $p<0.04$. In other words, there is evidence to suggest that the interviewees' ability to elaborate on and support their thoughts with more explanations increased after the visit.

4. Mastery Dimension

The last dimension to examine in this section is the mastery dimension. It involves an assessment of the quality of someone's understanding, ranging from that of a novice to an understanding more like that of an expert (1=simple, novice like understanding; 4=highly detailed, expert like understanding). In the analysis of the mastery dimension each conceptual category in the students' responses in the entry-, exit- or interview-PMMs was given a score on the following four-point scale: (1) no/simple understanding; (2) expected/predictable/"normal" level of understanding when talking about civil rights issues; (3) developed, relatively high level of understanding; and (4) deep, highly detailed, expert like understanding. The four-point scale is based on the scale proposed by Adelman et al. (2000, p.53), which scores the intensity of emotion associated with responses in each conceptual category. For the eight interviewees in particular, an average score for exit- and interview-PMMs was acquired for each of them to remove the interview element as a bias in the score.

A paired t-test was performed and demonstrated a significant increase in the mastery scores between the entry- and exit-PMMs, $t(22)=4.70$, $p<0.001$. Evidence is therefore provided to show that students' overall understanding about 'civil rights' was enhanced after the visit.

In other words the visit had an impact on students' knowledge and associations with 'civil rights'.

To complement the analysis across the four dimensions, a qualitative analysis of the PMMs collected by eight participants was conducted. This analysis was made possible due to the availability of interview data. For these eight students, in particular, entry-, exit- and interview-PMMs data are available. The analysis of the maps in light of the interview data provides some insights regarding the development of understanding among the participants. The findings from this analysis are presented in the next section.

7.2.1.2 Qualitative Analysis of the Interviewees' Personal Meaning Maps

For this analysis, attention was drawn to terms that students' chose to include in their PMMs, because these were considered to be salient features of the meanings the students' made. The analytic attention is also on artefacts/objects and resources encountered or used during the museum activities in order to examine whether these inform the students' PMMs and assist them in making connections across the settings. The dimensions within the framework proposed by Falk et al. (1998) were also taken into consideration. Specific examples will be employed to illustrate the points raised in the analysis.

Table 7.5 Participants with interview PMM data

Interviewees	Groups	Type of Visit
Adam	Group 1	Floating
Kevin	Group 3	Floating
Neil	Group 4	Focused
Keith	Group 4	Focused
Nana	Group 5	Hybrid
Sara	Group 6	Hybrid
Maria	Group 6	Hybrid
Jack	Group 7	Hybrid

The interviewees' names and visit groups are shown in Table 7.5. This table also draws on the findings of Chapter 6 and points to the type of visit each one had. Two of them (i.e. Nana, Adam) responded to the researcher's prompt to modify their PMMs, therefore their exit-PMMs consisted of two parts. A few examples are employed next as exemplifications for exploring the issues of interest outlined in the following two sections.

A. Entry-PMMs

In the entry-PMMs only one interviewee included a node related to 'civil rights', i.e. 'Black Rights' (see Fig. 7.3 below). Half the maps (n=4) associated the concept with influential individuals that were seen as demonstrating positive action in the 'Civil Rights' movement worldwide (e.g. 'Nelson Mandela'; 'Martin Luther King Jr'), pointing to a view of history dominated by 'great men'. A few (n=2) included names of institutions (e.g. 'UN, EU') that, according to Kevin, "set the rights for everyone to live with by".

Acknowledgment of political factors was also noted (n=3) in the entry PMMs. Adam, for example, justified the node 'Nelson Mandela' because "he was in apartheid, black civil rights and Africa, difference...". This shows that Adam had some understanding of the concept, although another node in his entry PMM (i.e. 'to be able to have certain rights') pointed to an overlap with human rights.

Such an overlap was apparent in many of the interviewees' entry maps (n=5) (e.g. 'right to food'), similarly to a finding noted in the analysis of the breadth dimension in the previous section. This observation was verified by a few responses (n=3) during the interview. Jack said:

I just thought it would be about the rights like general rights, about how could you live your life...and it is most of it, but like, specifically I thought it was about you eat and all that stuff...

[Jack, Interview Data Extract]

Similarly, Neil was also thinking of ‘rights’, as indicated by the following extract:

when I thought of civil rights, I thought it was just rights, like right to speech, right to freedom, education, fair trial, life...do’s and don’ts, tyrants, leaders, nobles, kings, parliament, government...I didn’t know much, but when it actually came to the trip it jogged my memory and got civil rights...

[Neil, Interview Data Extract]

Moreover, the name ‘Hitler’ was included in two entry maps (n=2). Use of this name might be related to the Scheme of Work the students were working on when the entry PMM was completed. Presumably Hitler was viewed as someone who “took people’s rights away...” (Kevin). Another node seen as related to school work was Nana’s “capitalist dictators affect civil rights” (see Chapter 5). Finally, a few entry PMMs (n=3) included a quality, feature or principles regarded as a characteristic of civil rights movement/issues, e.g. ‘equality’, ‘fairness’, ‘oppression’.

B. Exit-PMMs

After the visit the majority of the interviewees (n=7) used terminology associated with civil rights, though, as with the analysis of the four dimensions, this was expressed with single words and short phrases. Overall, almost all the interviewees (n=7) were using more conceptual categories to describe their understanding and could demonstrate refinement,

reinforcement or development of understanding, although the depth and quality of understanding varied. The four examples that follow (Example A-D) will demonstrate this point. The last example (Example E) will focus on a student whose conceptual understanding about civil rights after the visit was not advanced.

Specifically, most students could make direct links to their visit experience ($n=7$), while two ($n=2$) used specific objects they saw as a concrete example to demonstrate their understanding. Evidence for this is provided in Example A and Example B. These two examples, along Example C, illustrate how a few students ($n=3$) attempted to associate their learning with contemporary events or situations of personal relevance to them. In particular, Example C will draw on one out of two interviewees ($n=2$) whose analysis pointed to their identity as Black British as having shaped their visit and impacted on their PMMs. This example will show that after the visit the participants were more likely to refer to actions people/groups take to impact on the movement or values/emotions. Another finding is that after the visit the participants were more likely to refer to civil rights in terms of groups that impacted on the civil rights movement. Evidence for this will be provided by Example D. The analysis further showed that the interviewees drew on specific tweets posted during the visit. Specific evidence will be provided in all the examples.

The photos that are used in the following analysis show the original maps, while the diagrammatic representations were created by the researcher in the 'MindNode' application (e.g., see Fig. 7.2).

Example A Keith

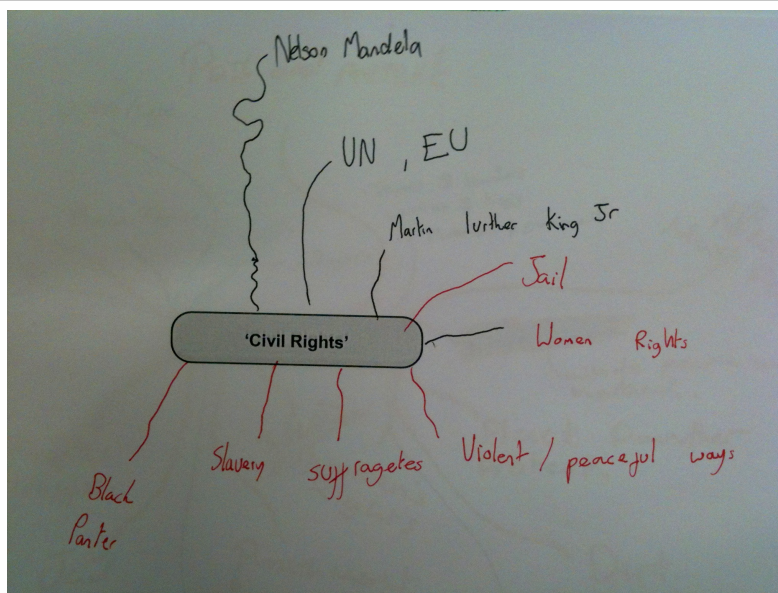
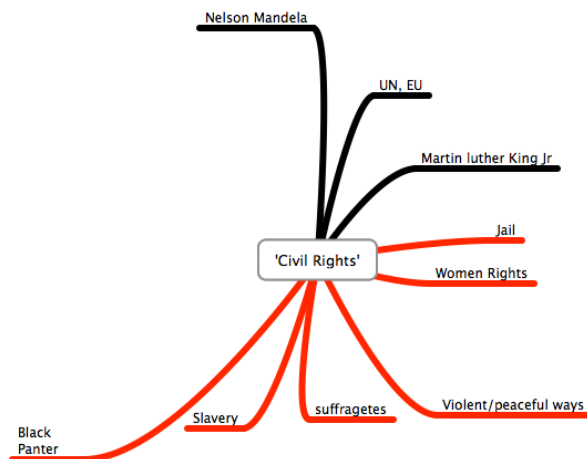
(Data from the Personal Meaning Maps)

Two out of six nodes (i.e. ‘slavery’ and ‘women’s rights’) in Keith’s exit-PMM point to two key themes underpinning the visit. At the same time, observation notes indicate that the node ‘Jail’ refers to the last exhibit he saw in the museum. In his own words during the interview: “I added the women’s rights, violent peaceful protesting, suffragettes, slavery and the Black Panther thing”. His direct reference to a specific museum object (i.e. Black Panther) provided a cue for a follow-up question. Keith said he remembers the picture of Black Panther “while they were protesting”. Indeed, the analysis in Chapter 6 (Table 6.7) showed that Keith and his group had seen this image while exploring the World City Gallery. A photo was saved on this group’s mobile phone, while a relevant tweet was posted (Appendix B, Table B4 - tweet t63).

Importantly, the terms ‘suffragettes’ and ‘violent/peaceful ways’, included in the exit-PMM, were also found in two tweets posted by his group (Appendix B, Table B4 - tweet t28, tweet t42). Keith chose to refer to these two terms in his response to the question ‘What did you learn during the visit that you didn’t already know?’:

we learnt... their [suffragettes] powerful way of moving, like, getting violent, violent protesting. We learnt a bit about peaceful protesting and I think in the museum helped me expand my ideas more

[Keith, Interview Data Extract]



*Entry-PMM: black, Exit-PMM: red

Figure 7.2 Keith's Personal Meaning Map (Example A)

Another point raised in the analysis of Keith's map was an association he made with a contemporary event when asked to elaborate on his meaning map. The implementation of this study coincided with the revolution in Libya against Muammar Kaddafi and the support western governments (e.g. UK, France) and international organisations (e.g. EU) showed to the Libyan people against regime. As shown in the following extract, Keith refers to Libya and to such institutions as 'they', but in his last sentence he opts for the word 'people', which might reflect a realisation that other groups or ordinary individuals also impact on civil rights issues

Because...if you can't control, like Libya, then, they will help them () to stop the violence happening... People can help saving people's lives and their rights

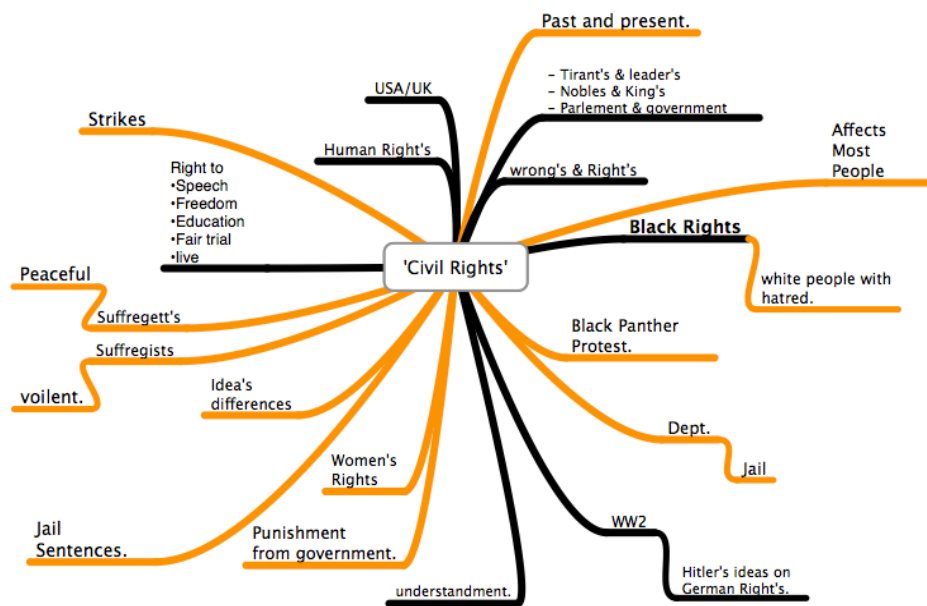
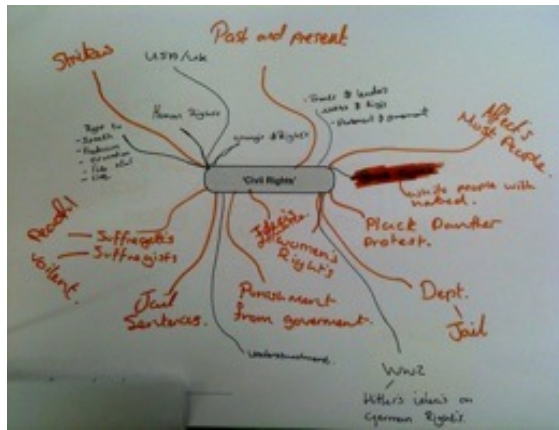
[Keith, Interview Data Extract]

Example B Neil

(Data from the Personal Meaning Maps)

Neil refers back to his group's activities during the visit and is able to articulate his views with specific examples from exhibits he had seen in the museum. All the nodes included in his exit-PMM (Fig. 7.3, in orange) are pointing to his visit experience (e.g. 'Black Panther Protest'; 'Women's Rights'). One node, in particular (i.e. 'Black rights'), was drawn in black in the entry PMM, whereas in the exit-PMM this was highlighted in orange and linked to the node "white people with hatred". The word 'hatred' attributed a deep and emotional extreme dislike, which clearly Neil viewed as once directed from white people against black people. This is believed to be directly associated to specific exhibits (i.e. 'Black Panther' and 'Keep Britain White') Neil and his group viewed during the visit (see Chapter 6, Table 6.7). It is verified by two tweets his group posted regarding the exhibits (see Appendix B, Table B4 - tweet t63 and t64).

Another finding from the analysis of Neil's map were the associations he made with his own life context, pointing to awareness that 'civil rights' is a concept relevant to everyone's life, not only in the past but also in the present. The first indication for a shift in his understanding is provided by the node 'Past and Present', which highlights the idea of 'time'. In the interview, he provided elaborations and expanded on these terms indicating



*Entry-PMM: black, Exit-PMM: orange

Figure 7.3 Neil's Personal Meaning Map (Example B)

that he understands the concept in a way that it is more succinct and personally relevant. In the following extract, Neil switches from the simple past to the present tense. Also, he uses the personal pronoun “we”, implying citizens who have the power with their vote to “get people in the parliament”. Similarly to Keith earlier, this might reflect a realisation that ordinary individuals can have an impact on civil rights issues. Neil also refers to geographical names of his own immediate environment (i.e. Broughton, Milton Keynes), which might indicate that he embraces a broader understanding of how politics not only

affected people's lives in the past, but also has an impact on his own life, his neighbourhood, city and potentially his nation:

In past, you know you got strikes, had suffragettes, suffragists, violent, peaceful, jail sentences and you think "Oh, what that has to do with civil rights?" because if... they didn't get their rights or they argue for it, they were going to jail. You got (debt) and people who were trying to stand up for what their rights are () women rights, black rights, idea and differences, punishments from government. It affects most people, it doesn't affect just a group of people in a little village. You'd expect like, government, like, when we get new people in the parliament, doesn't just affect Broughton, it affects the whole of Milton Keynes...

[Neil, Interview Data Extract]

Finally, when Neil was asked during the interview to elaborate on what he had learnt during the visit that he had not known before, his response revealed a realisation that the civil rights movement involved ordinary people from all social backgrounds. This is illustrated by the following:

I learn some more stuff, like, it wasn't just him [Martin Luther King]. It was actually the people themselves who were just protesting and saying "Look, I don't want to live this way" like the Black Panther... THAT actually changed my mind, coz...I didn't realise that so many people, from both sides, black people, just normal working people, fight for their rights...

[Neil, Interview Data Extract]

Neil seemed to have moved from a history of 'great men' to a history that is 'social', by stressing processes and experiences of ordinary people over key events or names.

II. References to specific groups and actions that impacted on the civil rights movement, as well as values/emotions

Example C Nana

(Data from the Personal Meaning Map)

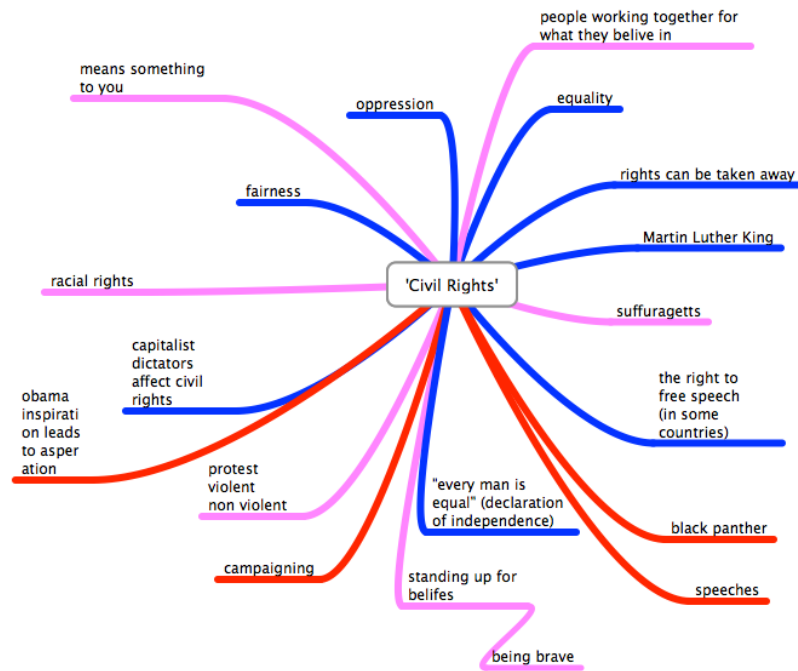
The analysis of Nana's meaning map shows that her identity as Black British shaped the meanings she made. Nana referred to things that shaped black people's collective history—campaigns and slavery—while she also drew on the words of the US president who talked about the impact of inspiration, whom she might feel inspired from. In particular, Nana responded to the researcher's prompt to modify or add to her map during the interview. She talked aloud while drawing the four red nodes (see Fig. 7.4):

The Black Panther (writes 'Black Panther') and...who else is there... wait...
campaigning... like speeches and stuff and empowerment...and inspiration leads to
aspiration

[writes 'speeches' and 'campaigning' and 'Obama inspiration leads to aspiration']

[Nana, Interview Data Extract]

Interpretation of these nodes is in light to an earlier response Nana gave during the interview, when she was asked "What did you learn during the visit that you didn't already know?". Nana recalled "this guy...I forgot his name but it was like Olalala...and about the slave trade" and drew on the Twitter stream to find out about this person, presumably because she could remember that her group had posted a tweet about this. Examining this tweet (Appendix B, Table B4 - tweet t68) and the nodes drawn in red, it could be inferred that Nana chose to include a term in her PMM that she picked up from this post (i.e. campaigning). For Nana, acts such as campaigning and speeches, might be viewed as acts of empowerment. Also, the node 'Black Panther' might be related to a tweet by another



* Entry-PMM: blue, Exit-PMM: pink, Interview-PMM:red

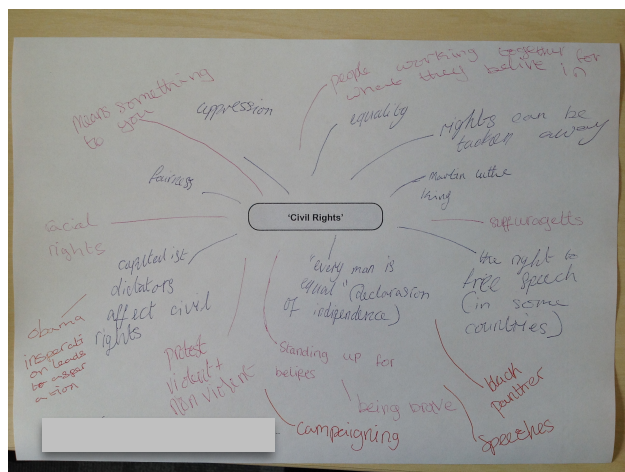


Figure 7.4 Nana's Personal Meaning Map (Example C)

group (i.e. “A British black panther demonstration Brixton, 1970”). Another of Nana’s nodes referred to Barack Obama, the first black president of the US. Nana, being a black person herself, might view Obama as an example of a leader who can inspire black people and consequently create aspirations. The analysis also reveals that the word ‘brave’—also appeared in one of her group’s tweets addressing women (Appendix B, Table B4 - tweet t24)—is included in the exit-PMM. It is a word with positive connotations and seems to

characterise all the people who are ‘standing up for belifes [beliefs]’ (Fig. 7.4). Overall, it could be argued that Nana’s understanding of the concept had not altered radically, though signs of conceptual development were visible both in her map and the way she talked about it. She seemed to have developed feelings of admiration for people fighting for their rights and used terminology that is specific to her visit to this museum.

Example D Sara

(Data from the Personal Meaning Maps)

The analysis indicated that Sara’s exit-PMM reflected her feelings, which were directly related to what she experienced in the museum. It appears that Sara moved from a quite formal perspective on the concept, to a more personal and affective approach. During the interview Sara referred to ‘suffragettes’ as a topic she knew nothing about before the visit:

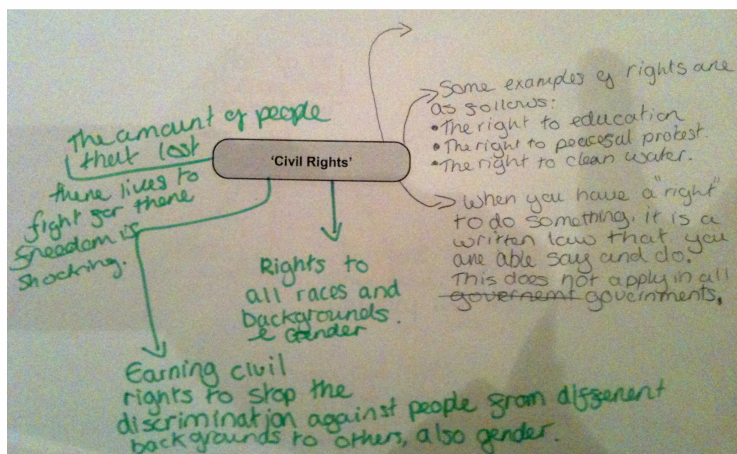
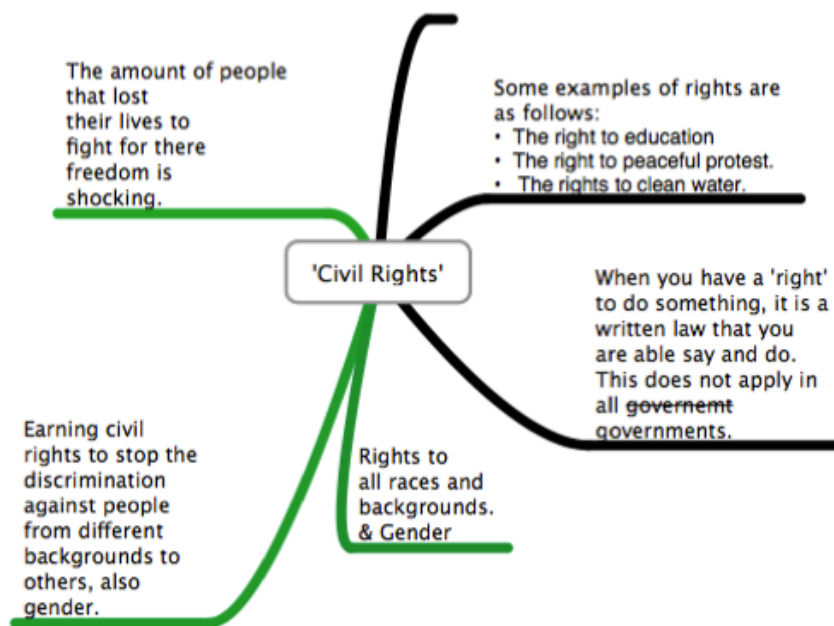
...there [at the museum] I saw...on the touch screen there was a video... You clicked on it and it explained it. I watched a couple of videos and saw some pictures on display and I didn’t realise how violent it was

[Sara, Interview Data Extract]

Learning about suffragettes and realising the extent of their struggle, as illustrated by this extract, might have been the reason for Sara emphasising the term ‘gender’ in her map. This term seemed to be associated with one of the visit’s main theme, i.e. women’s rights. What is more, in the interview, Sara pointed to the green colour in her map as the “right to race and backgrounds’ agenda and civil rights to stop discrimination”. She carried on by saying that

it [green colour] shows not just rights, is rights about humans, all kinds...and then how they were treated differently, even if we are all the same

[Sara, Interview Data Extract]



*Entry-PMM: black, Exit-PMM: green

Figure 7.5 Sara's Personal Meaning Map (Example D)

The idea of 'equality', expressed in this quote, was also raised in a tweet posted by her group in the visit (Appendix B, Table B4 - tweet t28). The tweet, the quote and another node in the exit-PMM (i.e. 'the amount of people that lost their lives to fight for freedom is shocking') are an emotional response to things Sara saw in the museum. Importantly, her feelings (i.e. word 'shocking' in the map) were expressed in a similar way to two tweets posted by her group during the visit (Appendix B, Table B4 - tweet t34, t30).

III. No reinforcement or development of understanding

Example E Kevin

(Data from the Personal Meaning Map)

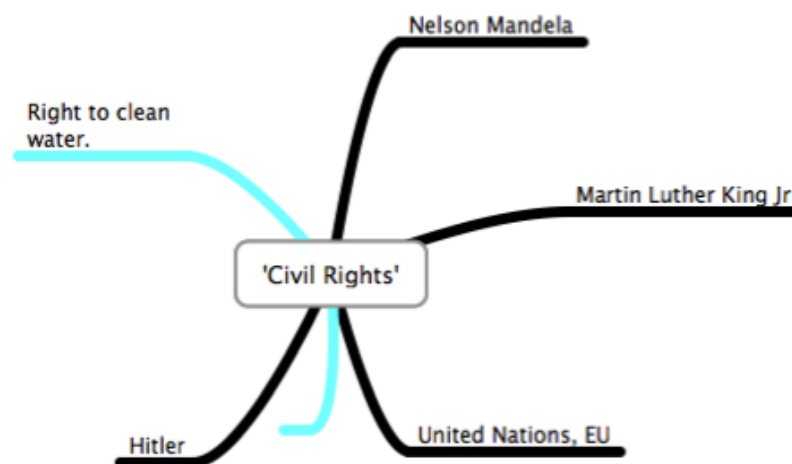
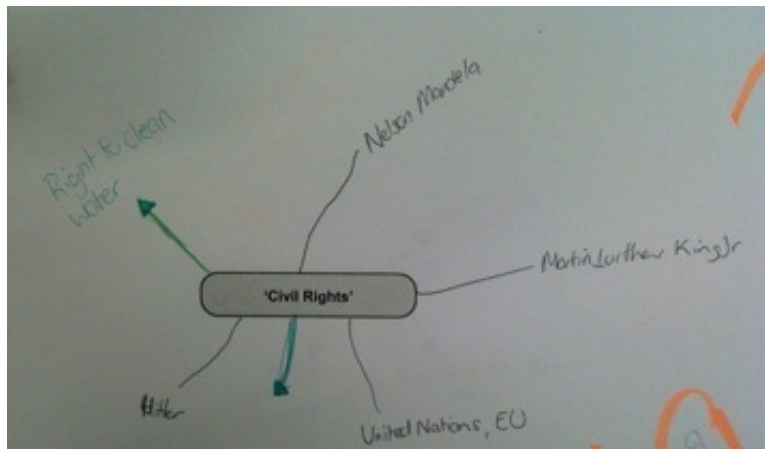
Kevin was the only interviewee whose understanding did not seem to be reinforced after the visit. This is demonstrated by the node ‘Right to clean water’ that he added to his exit-PMM (Fig. 7.6). This node cannot be considered as associated with the concept ‘civil rights’. He claimed to have put

things I learnt about, like, I put that after...when I saw about the....in London and all the () people around the world still not allowed to find their way to clean water

[Kevin, Interview Data Extract]

Here, Kevin was probably referring to an exhibit (i.e. ‘Interactive Display’) his group encountered in the museum (see Appendix B, Table B6). Despite linking his PMM with the visit experience, this extract illustrates that his view about the ‘civil rights’ remains largely associated with human rights. His understanding about the concept was vague, still sharing a view associating civil rights with fundamental rights to which people are entitled simply because she or he is a human being. Therefore, his understanding did not seem to be reinforced and as a result, Kevin was a participant who failed to show any development of disciplinary knowledge.

In the next section the analysis of the group presentations prepared in the classroom after the visit will be provided.



*Entry-PMM: black, Exit-PMM: light blue

Figure 7.6 Kevin's Personal Meaning Map (Example E)

7.2.2 Data from the Group Presentations

The aim of this analysis is to examine whether and how the activity in the museum (e.g. photos taken, tweets posted) is represented in these collages. The analytic attention is particularly on the role of the online posts and photos as resources for creating the collages. This helps answer the question about whether the online discourse has a role in the development of the students' understanding and assists in making connections across settings (RQ2). In other words, the focus of this analysis will be specifically on identifying signs which show 'connection building' and the role of the technologies in mediating this.

The first part of this section discusses the key points raised from the analysis of all the presentations. In order to explore the issues of interest outlined in the discussion the second part will provide a few examples whilst the last part of this section provides a summary of the ‘peer review’ activity that took place in one of the classroom lessons (see Table 7.1).

7.2.2.1 Overview of the group presentations

In total seven collages were created over the two post-visit lessons. Observation notes suggest that the teacher’s involvement in this activity was limited. In fact, after outlining the task in Lesson 5, the teacher was working on the school’s administrative tasks (see Section 7.1.1 for a description of the lessons).

The expressed aim of this activity was for students to address the inquiry assigned to them in the museum (see Appendix B, Table B1). The analysis showed that three groups accomplished this to some extent (n=3) (Group 4, Group 5, Group 6). Three groups acknowledged their inquiries (n=3) (Group 4, Group 5, Group 7), either by referring to them in their oral presentation or by including them in the collage. Post-visit video data collected by Group 6 shows that a clear distribution of roles took place among the four students (i.e. checking photos, writing notes). It also shows students drawing on resources, such as Wikipedia and the BBC Learning site (see Example B). No data is available for other groups in relation to these points. Moreover, one group (n=1) approached this task by creating a storyboard (i.e. Group 4).

The analysis illustrates a dominance of the visual mode across the collages with all the groups making use of photos, as shown in Table 7.6. This table demonstrates that five

groups followed the instruction of a maximum nine pictures to be included in their collages, and the same number (n=5) made use of the ‘Picture Pool’ (see Section 7.1.1.2). Photos used in the collages were seen as providing links with the museum visit, as all the photos used—except two—featured objects or aspects of the participants’ museum experience. Most groups (n=5) made a good selection of photos, although a lack of contextual information across the collages was noted. This point will be demonstrated by Example C that follows. For two groups (i.e. Group 1, Group 2), their collage largely consisted of an array of photos (see Table 7.6) bound by the visit, but without any narrative ties in the context of the collage. Moreover, one group (n=1) used a photo to link their collage with contemporary events (i.e. ‘Occupy Wall Street’ demonstration) (see Example C).

Table 7.6 Outline of the analysis of group presentations

Type of visit	Group	Photos (Total: 96 photos)	Picture pool	Text	Oral presentation
Floating	Group 1	39	√ (32 photos)	√	x
	Group 2	22	√ (19 photos)	x	x
	Group 3	4	√ (3 photos)	√	x
Focused	Group 4	9	x	√	√
Hybrid	Group 5	8	x	√	√
	Group 6	6	√ (6 photos)	√	√
	Group 7	8	√ (3 photos)	√	x

Another finding from the analysis was that groups which used the textual and oral modes alongside the visual, had stronger narrative structures and provided cues to their audiences. All the collages, except one (n=6) (Table 7.6) had some text added to frame the photos,

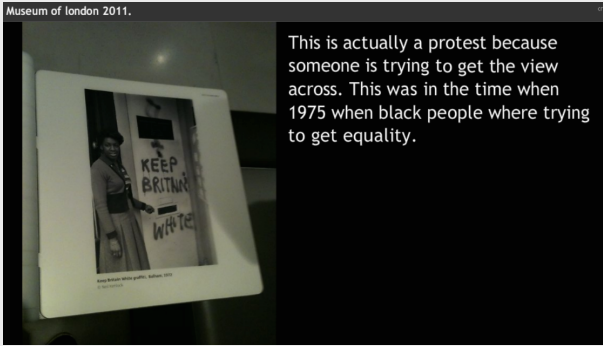

while three groups (n=3) complemented their collage with an oral presentation. The oral presentation in the context of this activity was viewed as a strong indication of whether their understanding after the visit had advanced.

In light of this chapter's aim to examine whether the online posts and photos had a role in the development of the students' meanings and making connections across settings, the analysis showed that three groups (n=3) used objects with specific links to prior knowledge (e.g. prison - Martin Luther King). Another technique employed by one group was to re-mix and re-interpret resources collected in the museum and to appropriate them in the context of their presentation. In this particular collage, objects with clear connotations were selected to assist the group to make a point and appeal to their audience. For example, photos of guns were used as a sign of violence, while a photo of a Buddha sculpture was a sign of peacefulness.

Another point raised by this analysis is that the participants were drawing on resources generated by others as a technique to help them undertake this task. This technique was predominately observed with photos (see Table 7.6, 'Picture Pool') and less with other groups' tweets (n=1) (see Example B). Nonetheless, the practice of drawing on resources without being associated with other practices (e.g. label reading, observing) might lead to misinformation and misunderstandings, it was the case with a particular poster from the War Gallery (i.e. 'Women Wanted for Evacuation Service'). This first appeared in a tweet posted by Group 1 (see Appendix B, Table B4 - tweet t36) and was re-used in four collages (see Example C).

Finally, a technique employed by four groups (n=4) was to draw on Twitter for re-using resources generated by the groups themselves. Example A that follows illustrates this point. In addition to this, two more examples are provided: Example B focuses on a group that drew on social interactions and content generated in the museum by others to create their presentation. Example C draws attention to a group that did not address its inquiry.

Table 7.7 Drawing on Twitter to resource the presentation (Example A, Group 4)

Collage/Frame B	
Visual/ Textual Mode	
Textual Mode	This is actually a protest because someone is trying to get the view across. This was in the time when 1975 when black people where trying to get equality.
Oral Mode	(the key of bringing the white) poster, it's sort of – it's still...protesting, it's not physical like - it's a peaceful method, it's not the best type of method for some people, but people still, they are still protesting because someone doesn't agree with what people are saying, doesn't what to do what people, other people say and trying to get their view across, well in 1975 where black people are trying to get (vote).
Resources	
Photos from 'Picture Pool'/online	 Graffiti, Balham
Tweets by Group 4	t64: #muvi3 the protest with the 'keep Britain White' this is a protest not a good one but someone is still trying to say something

Example A Drawing on Twitter as a resource for the presentation

(Group 4 - Data from Group Presentations)

Among the photos captured by Group 4 in the museum was an image which depicts a black woman by a house's main door, on which, presumably, white people wrote 'Keep Britain White' (see Chapter 6, Table 6.7). This photo was included in Group 4's collage (Table 7.7). In the context of Group 4's oral presentation the photo is called "a white poster" (Table 7.7, the 'Oral Mode' row) and serves as a sign of a protest. As shown in the 'Oral Mode' row, this presumably contradicts the students' beliefs. A similar belief has been expressed in the tweet t64 (Table 7.7).

Example B Drawing on social interactions and other resources

(Group 6 - Data from Group Presentations)

The analysis of post-visit video data drew attention to the social interactions among students when viewing the photos in the 'Picture Pool'. The post-visit video data showed that Group 6, at times joined by Group 7, spent a considerable amount of their time looking at photos (e.g. Maria: "Hahahha, look at Gareth, hahaha! That... was amazing!" Post-Visit Video Data: 21'24" 14 March 2011). All seemed to share a strong interest in going through the photos and interactions, such as "Ohhh, yeah, I remember that. I was standing right here... (Maria); "I got that picture!!!" (boy, Group 7); "Ooooh my Good... (laughing)" (Maria) [Post-Visit Video Data: 7'04" - 09'04 14 March 2011]. Photos seemed to provide prompts to help the students remember their visit experience, while social interactions with photos as points of reference were facilitated.

Regarding the collage created, the term 'gaining' was included in the title (see Table 7.8, Frame A). Despite subtle differences in the terms discussed between Maria and Sara (Table

Table 7.8 Drawing on social interactions and other resources in the presentation (Example B, Group 6)

Collage/Frames		
Visual/Textual Mode	 <p>A</p>	 <p>C</p>
Textual Mode	THE HISTORIC STORY OF GAINING RIGHTS IN PICTURES	The suffragists fought for women rights in a peaceful way but the suffragettes fought for womens rights in a violent way
Oral Mode	The hist- the bit for us was 'how people get the rights to have what they have today'. So, the hist-the historic- story of getting rights is in pictures.	The suffragettes, the suffragists? The suffragists fought for women's rights in a peaceful way, but the suffragettes fought for women's rights in a violent way, so some almost (die) and all that.
Resources		
Photos from 'Picture Pool'/online	 <p>(from 'Picture Pool')</p>	 <p>(from Picture Pool)</p>
Tweets		t42: #muvi2 the violent method of the suffragists was a spark which got more people involved while posters were more long term (by Group 4)
Websites	BBC Learning and Wikipedia	
Extracts from classroom	<p>Extract A 26'46'' - 32'10'' [Video Data, Classroom Session, 18 March 2011] M: Maria S: Sara T: Teacher R: researcher</p> <p>M: What should we write? S: History of pictures...Pic...Wait! History of Rights...Historic Rights....Historical rights () story... <i>(Maria is typing)</i> 1.M: Which age? Do you remember?... Should we add that? <i>(points to the screen)</i> 2.S: Yeah, write it...in pictures! Change here the font...<i>(points to the screen)</i> 3.T: 20 minutes, you guys have to finish 4.S: Do you think it should be 'The historic story of earning rights?' <i>(asks researcher)</i> 5. R: Yeah...sounds good. 6.S: Or the historic story of receiving rights?' Or the Historic story of receiving and gaining...gaining, gaining! I'm not sure if it's earning, because they are not earning... 7.R: Looks good.</p>	<p>Extract B 24'50-24'53'' Video Data Classroom Session 18 March 2011] M: Maria E: Elisa</p> <p>1. M: Right...Which one? 2. E: Which one inspires us? Suffragists or suffragettes? So I'd go for suffragettes <i>(picture added)</i></p>

7.8, Extract A), Sara's statement "I'm not sure if it's earning, because they are not earning..." (Line 6) might suggest that her understanding of 'gaining' is an act or process through which there was an increase in rights and therefore more apt for their presentation. It is noted that the term 'earning' was used in the exit-PMMs of three members of Group 6 (see Section 7.2.1.2 - Example D).




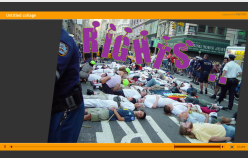



The analysis showed that all the photos in Group 6's collage were drawn by other resources, e.g. the 'Suffragette' cover (Frame C). This helped them to differentiate between suffragettes and suffragists, and violent and peaceful methods (Table 7.8, the 'Oral Mode' row), while it points to similarities with a tweet (Appendix B, Table B4 - tweet t42) posted by Group 4. The Extract B in Table 7.8 further reveals that 'inspiration' was the reason for selecting this image, and suggests an emotional response to the visit. Similar findings emerged from the analysis of the PMMs (see Section 7.2.1.2 - Example D).

Example C Not addressing an inquiry

(Group 3-Data from Group Presentations)

The analysis in Chapter 6 showed that Group 3 had a 'Floating' visit experience. Arguably, this type of experience did not provide the participants with the appropriate resources to address their inquiry. As a result, none of the the photos used in the collage (Table 7.9) was generated by Group 3. Instead, Group 3 created a presentation with a clear message and structure by re-using resources generated by other groups. They also used a 'catchy' slogan that appealed to their audience. All photos, except the first one, are appropriate selections and link to the museum visit and theme. The last photo makes an association with a contemporary event. Lack of any further text or oral speech is, however, a strong indication that their understanding has not advanced, and as a result they did not address their inquiry.

Table 7.9 A presentation not addressing an inquiry (Example C, Group 3)

Collage/Frames				
Visual/ Textual Mode				
	A	B	C	D
Textual Mode	Get up	Stand Up	FIGHT 4 YOUR..	RIGHTS ..
Oral Mode				
Resources				
Photos from 'Picture Pool'/ online				
	'Women Wanted for Evacuation Service' (on Twitter)	Black Panther Demonstration, London (on Twitter)	History Painting' (John Bartlett, 1993-1994). (from Picture Pool)	(from the Web)
Tweets				

7.2.2.2 Peer-review activity

In total, thirty-seven tweets (N=37) were posted during Lesson 7 (see Section 7.1.1.2 for a description). Table 7.10 provides the total number of micro-posts per presentation and per group. The majority of the tweets (n=31) made use of the hashtag #bestcollage, which demonstrates a development in the use of this feature, especially compared to the pre-visit lessons. No 'off-task' tweets were generated during this lesson. On the contrary, all the tweets posted acknowledged the criteria set in the beginning of the lesson, i.e. focus of the presentation, relevance of information and appropriateness of the photos. Table 7.11 provides some exemplar tweets posted during this lesson. In the end of this lesson, Group 4 was voted by the others as having the best presentation.

Table 7.10 Data from Twitter during the peer-review activity (Lesson 7) (N=37)

Group	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Number of tweets posted by	5	6	4	6	4	7	5
Number of tweets addressing the presentation by	7	5	6	7	4	3	5

Table 7.11 Exemplar tweets associated with the peer-review activity (Lesson 7)

Criteria	Tweets
Focus of presentation/ Overall comment	<ul style="list-style-type: none"> • <u>#bestcollage</u> [Group 4] a lot of text but it was relevant and images went with text. Overall really good a bit slow though xx • <u>#bestcollage</u> [Group 1] had way too Many pictures of random objects no information. Over all quite poor. • <u>#bestcollage</u> really good and interesting we really enjoyed watching it, and looks like a lit of effort was put into it xx
Relevant Information	<u>#bestcollage</u> really good, good captions and relevant text ! Very emotive and relates to the images xx
Appropriate photos	<ul style="list-style-type: none"> • <u>#bestcollage</u> [Group 1] they had loads of images but they weren't that relevant and not enough text and info xx • good pictures and got the message across

7.2.3 Data from the post-visit Questionnaires

This section will present the analysis of the post-visit questionnaire (QII) (Appendix A, QII). Within each category key aspects identified as contributing to the interpretation of the main findings from this study will be highlighted and discussed (see Chapter 4, Section 4.5.5 for a description of the method). Tables with findings from this analysis are provided in the Appendix B (Table B10, Table B11 and Table B12)

7.2.3.1 Views on the visit to the Museum of London

Part A of QII was structured around participants' views about the visit to the MoL (Appendix A, QII/A1 - A7). Table 7.12 shows the twenty original items of Question A1 grouped together on the basis of a trait/construct that underpinned them (e.g. learning,

Table 7.12 Views on the visit to the Museum of London (QII/Question A1) (N=23)

Items		Aggregated Data						Key Metrics	
(1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree)		1	2	3	4	5	Missing	Median	IQR
Learning									
1	The visit has given me lots to think about.	1	13	4	4	0	1	2	1
2	I discovered some new information during the visit.	6	13	1	1	0	2	2	1
3	The visit has given me a better understanding of the subject 'civil and political rights'.	3	11	7	1	1	0	2	1
4	I have learnt new things.	6	12	4	1	0	0	2	1
5	The museum was a good place to learn in a different way to school.	9	11	2	1	0	0	2	1
6	This visit was a good chance to pick up some new skills.	3	13	4	2	1	0	2	1
Technologies									
7	I liked sharing my comments about artefacts online.	5	10	7	1	0	0	2	1
8	Reading my classmates' comments about artefacts was pointless.	0	3	10	7	3	0	3	1
9	Using new technologies during the visit made me feel more engaged with the stuff I was doing.	8	11	2	1	0	1	2	1
10	Using new technologies during the visit was confusing to me.	1	1	5	9	6	1	4	2
Artefact Interpretation									
11	Some things I saw were hard to understand.	0	3	9	9	1	1	3	1
12	It was difficult to make sense of this visit.	0	4	8	7	3	1	3	1
Feelings/Attitudes/Future Action									
13	This visit made school work more inspiring.	8	6	6	2	0	1	2	2
14	I would visit the Museum of London again.	5	11	7	0	0	0	2	1
15	I felt bored during the visit.	0	2	6	14	0	1	4	1
16	I would follow Museum of London on Twitter and/or Facebook.	1	10	7	3	2	0	3	1
17	Museums might be more interesting than I thought.	3	15	3	1	0	1	2	0
18	I enjoyed the stuff I did during the visit.	5	12	3	1	0	2	2	0.5
19	Museums are boring.	0	1	7	12	3	0	4	1
20	This visit was more interesting than my previous visits to museums.	4	8	8	2	0	1	2	1

artefact interpretation). For each item in Table 7.12, the Median and Inter-Quartile Range (IQR) were calculated: 1. the median shows the ‘likeliest’ response. 2. the IQR shows whether the responses are clustered together or scattered across the range of possible responses. Larger IQRs might suggest that opinion is polarised.

Participants responded positively to all six items related to learning. The value ‘Agree’ was the one that not only appeared the most, but was also the ‘likeliest’ response (Mdn=2). Evidence for a perceived development in subject knowledge was provided (Item 3, Mdn=2), while many participants thought that they learnt new things (total n=18) (Item 4) or discovered some new information during the visit (total n=19) (Item 2). However, the high number of students being neutral (n=8) or indicating an agreement (n=4) with the item “It was difficult to make sense of this visit” (Item 12) is noted. The analysis of the open-ended questions in Part A of QII, following in this section, sheds light on reasons explaining the difficulties in the visit.

Most of the respondents rejected the idea of feeling bored during the visit (Item 15) (Mdn=4, IQR=1.00) or that museums are boring (Item 19) (Mdn=4, IQR=1.00). Instead, the item “Museums might be more interesting than I thought” (Item 17) received strong agreement by the respondents (Mdn=2, IQR=0). As a result, the majority of the students (n=17) stated they enjoyed the visit activities (Item 18) (Mdn=2, IQR=0.5). Similar findings were reported in a related question in Part A (QII/A2) regarding students’ evaluation of how they experienced the visit. In this question the rating of the visit is positive, with top scores (≥ 7) (i.e. adjectives with positive meanings e.g. wonderful) appearing more frequently in the students’ responses (see Appendix B, Table B10).

All the respondents, except one, expressed their agreement with the idea that they were engaged in the various activities because they were using new technologies (Item 9) (Mdn=2, IQR=1.00). In this item, the high number of students (n=8) opting for the value 'strongly agree' is noted. In addition to this, students seemed to like the practice of sharing comments about artefacts online (Item 7) (Mdn=2, IQR=1.00). When it comes to the practice of reading comments online (Item 8), only a few (n=3) thought of this as pointless, and many (n=10) appeared neutral (Mdn=3).

To further examine students' views on the use of technology during a museum visit, Part A included a hypothetical question (see Appendix A, QII/Question A3), where students had to respond on the basis of a scenario stating they would use similar technologies in another visit. The findings from this question can be found in Appendix B (Table B11). In this question, agreement by all was reported, showing that the participants were keen on using the technologies again (Mdn=2) (Item 1). Importantly, an agreement with the notion that technologies enhance the social character of the visit (Item 7, n=21), and at the same time are tools to share (Item 8, n=17) or reflect on their learning (Item 9, n=16) was reported. Their responses regarding artefact interpretation (Item 3) are consistent with findings in Table 7.12.

Experience in the museum

Part A of QII also included four open-ended questions (QII/Question A4-A7) on decisions participants made in the museum and their experience.

Selection of objects in the visit

The first open-ended question (QII/A4) focused on how students selected specific objects during the visit. In line with findings reported in Chapter 6 (see Section 6.2.4.1), reasons such as the topic of the visit (n=10), the impact of Twitter (n=7), characteristics of the objects (i.e. size) (n=10) or students' personal interests and motivation (n=10) emerged. Exemplar quotes are provided in Table 7.13. Regarding the impact of Twitter on the selection of objects, three students (n=3) viewed comments or pictures posted as directing them to find an object. Three others (n=3) referred to looking for appealing content for their audience (e.g. Kevin, Heather in Table 7.13), while the practice of 'serendipitous browsing' underpinned the responses by two students (n=2). Similar findings emerged from the interview data and will be discussed in Section 7.2.4.1.

Table 7.13 Exemplar quotations associated with the selection of objects (QII/Question A4) (N=23*)

Selection of objects based on:	No of Participants	Exemplar Quotes by participants
Characteristics (e.g. size, shape)	10	"We decided to pick the objects by mostly the way they looked but also if they gave a lot of information, both interesting and relevant to our topic" (Elisa)
Use of Twitter	7	<ul style="list-style-type: none">• "We choose to look at the items we did because of the tweets the other groups put" (Harmony)• "We decided on put the images or status that we thought would get people's attention e.g. mayor's carriage" (Kevin)• "It's just about having a good eye of which pictures to put up on Twitter really" (Heather)
Topic of the visit	10	"...I really showed more interest in the artefacts that inspired me e.g. the medals given to the brave suffragettes" (Nana)
Personal Interests/ Motivation to Learn	10	"I chose the object that was most appealing which intrigued me to learn more" (Sara).
Serendipitous Browsing	2	"Things that caught my eye and genuinely interested were the ones we took pictures of" (Rita)

* Three students did not provide an answer to this question

Best and least favourite parts of the visit

Students were also asked (QII/Question A5-A6) to identify their best and least favourite parts of the visit. Two students gave no response to the first question. For the majority (n=13) the highlight was getting to use the iPhones/Twitter to take pictures and share comments online, e.g. “got to use iPhones and socialise we [with] friends, shared our opinions and got our point across” (Maria). Six students (n=6) pointed to looking at objects as their most favourite activity. Regarding the least favourite part of the visit, approximately half the students (n=10) referred to activities or tasks that they were asked to undertake, e.g. being in the museum’s computer room, worksheets/instructions of the activities, writing/discussing, making the collage. Among them, only one student saw tweeting as a distraction, e.g. “I least liked tweeting, because I was so focused on the artefacts” (Tina). Issues mentioned less often were lack of time during the visit (n=2), group formation (n=2), and the museum itself (n=1). Four students gave no response to this question.

Preferred changes to visit plan

Students were asked (QII/Question A7) to state one thing they would change in the visit, provided they had the opportunity. A consistency between the responses given in the previous question (A6) and this one was noticed, with activities or tasks in the museum (e.g. not meeting in the computer room, worksheets, Vuvox) more frequently reported (n=6), e.g. “make the booklets less complicated and explain it a bit better” (Maria); “the book work because you had to rush around not get to look at things properly” (Julian). Increasing the duration of the visit (n=5) and selection over the group formation (n=5) were also among the popular responses.

7.2.3.2 Views on the use of SNSs in the classroom

Part B in the post-visit questionnaire (QII/Question B1-B4) collected data regarding students' views on the use of SNSs during their history lessons at school.

As with other questions, in Question 3 (B3) students had the option of saying to what extent they agree or disagree with ideas expressed in a set of items (see Appendix B, Table B12). Overall, most students stated they enjoyed the activities (n=13) (Item 3, Item 11), and found them interesting (n=14) (Item 1). The majority (n=16) appeared willing to do activities with SNSs again, and many (n=12) thought of them as beneficial (Item 6). Only a few (n=2) viewed the activities as not important (n=2) (Item 2) or boring (n=5) (Item 7).

It is noted that the instruction in this question (B3) had some ambiguity, possibly resulting in a few students responding with 'Twitter' in mind, while others were referring to 'Vuvox', despite differences in features and use during project work. Also, many items in this question had subtle differences in their meaning and similar formulation (e.g. Item 1 and Item 9, Item 5 and Item 11). Therefore, the findings above will be discussed in light of the findings of the three open-ended questions in Part B. These questions were also related to their experience with SNSs during their history lessons (QII/Questions B1, B2 and B4).

Value and importance of SNSs

Consent among all the respondents was reported in the three statements (QII/Question B1), with students stating that SNSs are useful (n=20), important (n=17) and beneficial (n=17) respectively.

In the first statement, SNSs were seen as useful because they were associated with learning (n=9). This marks an important shift when compared to the analysis of the pre-visit questionnaire. In QI, students viewed interactions within one's network as the main value of SNSs (see Section 5.2.1.2), while in QII only one response referred to this aspect. Their usefulness was also seen as associated with specific practices, e.g. reflection, sharing. Table 7.14 illustrates the findings from this question. The only criticism expressed here was related to the participants' uses of SNSs, e.g. "They were good, but students spent too much time on them and just put 'it was good'" (Neil). This issue regarding the quality of the content generated was raised in the interviews and will be discussed in Section 7.2.4.1.

Table 7.14 Exemplar quotations associated with the statement "I think that doing these activities with SNSs are useful/not useful because..." (QII/Question B1) (N=23*)

Perceived value regarding use of SNSs in the classroom	No of Participants	Quotes by participants
Learning/Skills Development	9	"...it was a different way of learning and it was faster for me to learn things" (Heather)
Tools associated with potentials and/or practices (e.g. aggregate/view content, reflect, share)	9	<ul style="list-style-type: none"> "...they made us think about it more because we were posting it" (Rita) "...they help keep all your findings together, and you are able to share the info with fellow classmates" (Sara)
Experience during the lesson	6	"...most of us found them fun especially twitter and if we find them fun we are likely to learn more from the topic" (Elisa)
Interaction within one's network	1	"...they help you get in touch and also teach you how to use the websites" (Tina)

* Three students did not provide an answer to this question

As with the main finding above, associations with learning were provided in the second (n=8) (QII/B1) and third statement (n=16) (QII/B1), as illustrated by Table 7.15 and Table 7.16 respectively. In both statements students were largely making links with skills development. Their importance was also seen as associated with specific practices that SNSs make possible, e.g. reflect, share (n=7) (Table 7.15).

Exemplar quotations associated with the statement “I think that doing these activities with SNSs are important...” (QII/Question B1) (N=23*)

Perceived importance regarding use of SNSs in the classroom	No of Participants	Quotes by participants
Learning/ Skills Development	8	“...it would give you better life skills” (Kevin)
Tools associated with potentials and/or practices (e.g. reflect, share, view content)	7	“so you think in a different way” (Nana) “...we can see other people’s ideas and opinions and apply it to our own work” (Elisa)

* Five students did not provide an answer to this question

Table 7.16 Exemplar quotations associated with the statement “I think that doing these activities regularly could help me to...” (QII/Question B1) (N=23*)

Perceived benefits regarding use of SNSs in the classroom	No of Participants	Quotes by participants
Learning/ Skills Development	16	<ul style="list-style-type: none"> • “...help me work in arguments” (Keith) • “...be more confident in sharing answers” (Saavi) • “...help link evidence in work” (Kevin) • “...memorise and research more efficiently” (Sara)

* Five students did not provide an answer to this question

Suggestions regarding use of SNSs at school

Participants were prompted to report problems or express ideas/suggestions with regards to the use of SNSs at school (QII/Question B2). Among the four responses (n=4) collected, two (n=2) expressed a concern about misuses at school. For example, Neil thought their use “need[s] to be very controlled” as “people go off track”. One response referred to potential uses, e.g. “quicker sharing” (Nana).

Use of SNSs outside the classroom

Regarding the students’ use of SNSs outside the classroom (QII/Question B3), among the sixteen responses collected (n=16), a few (n=5) referred to the frequency of their use.

Three students (n=3) reported no use at home, while for half the students (n=8) the main reason was communication with friends or updates about the world.

7.2.4 Data from the Interviews

7.2.4.1 Analysis of interviews: Students

Interviews with 11 participants (N=11) were conducted after the visit and analysed thematically. In what follows, interview data will be presented to give insights on how the participants viewed the project work. In Chapter 4 a detailed description of this method (Section 4.4.1) is provided. A list of the interview questions and number of responses is provided in Appendix A.

1. Part A: Visit

The first part of the interviews was structured around the visit and highlighted three main areas: design of the visit; tools employed and learning.

Overview of the visit

The interview started with all the interviewees being asked to recall a school visit to a museum. Many (n=6) could not recall any and were referring to visits with their families. None of the interviewees mentioned museum experiences with the use of technology before. What is evident from a few responses (n=4) is an association of museum visits with feelings of boredom and characteristics resembling a formal education setting (e.g. guided tour with teacher, no choice over objects, use of clipboards). Specifically, Sara, recalled a previous visit that

was boring, really boring... we didn't have much freedom, we had to be with a teacher, you were not allowed to go anywhere, to touch anything, to interact...

[Sara, Interview Data Extract]

Later on, when students were asked to refer to their expectations from the visit, Sara raised the issue of 'trust' through a comparison with previous visits. She said

I thought it was going to be whole class following a couple of teachers and taking about objects you see, writing it down... but you had freedom... so open...It was nice to know we were trusted to do that

[Sara, Interview Data Extract]

Overall, in expressing their views about the recent experience in the Museum of London, positive wording among all the interviewees was noted. Words such as 'fun', 'good', 'interesting', 'different' 'social' were included in their responses. Regarding the highlights of their visit, specific objects/galleries (n=3), tasks (n=1), learning (n=1) or social aspects of the visit (n=2) were noted. Kevin was the only one referring to the Twitter stream:

Seeing everyone's reactions, like different things around the museum and what they thought about it on Twitter. It was really interesting to think of what other people thought of the visit

[Kevin, Interview Data Extract]

Seven (n=7) interviewees who were specifically asked whether they could read the tweets over the course of the visit were all positive. Adam referred to getting the iPhone in turns to read comments, while Kevin recalled a specific artefact he saw on a tweet

Yeah, I read a couple... some about the carriage, the Mayor's carriage, so we went around and wanted to find it.

[Kevin, Interview Data Extract]

His response indicated that they were open to the visit experience, resulting in his group (Group 3) not following the visit agenda. Chapter 6 pointed to similar observations for other groups. Despite not including a question to address why a few groups did not follow the visit agenda, other responses in the interview give insights as to how students may have perceived the purpose of the visit, e.g. the following response from Kevin:

we were looking at different artefacts in the museum...and putting on Twitter about what we thought and where it would be for other people to (comment and come and look), what we thought it would be interesting and...what we thought other people would be interested in

[Kevin, Interview Data Extract]

Here it is clear that identifying and distributing information and pictures of objects that other students might be interested in seeing was the perceived aim of his group. Oriented to an audience and developing practices to appeal to their audience was a category emerging in various responses during the interview and will be discussed further in this section.

Another question related to the visit was ‘Have you behaved differently in the visit to the way that you normally behave during school visits?’. Among the students who responded positively (n=6), Adam for example stated “I behaved a little bit better... I had to pay attention or I’d miss out” (Adam). Whereas this quote reveals a fear of missing out, another concern emerging from the same question was about content to put online:

We were trying to think of things we could put up on Twitter.... We were trying to think of what we could put on and we couldn’t think of what we wanted to say...

[Kevin, Interview Data Extract]

This point is related to the earlier discussion about acknowledging an audience, but it also indicates some challenges posed by a museum space.

All interviewees (n=11) agreed the visit went well (Q: Do you think it went well overall?), but when asked “What would you do differently?”, their responses included: exploring the museum/objects more (n=4) (i.e. labels, information, increasing in the visit time (n=4), forming groups with friends (n=2) and changing the role distribution in his group (n=1).

Use of technologies in the museum

Regarding the use of Twitter and mobile technologies during the visit, interviewees were asked to reflect on being able to take an iPhone with a camera and Internet connection during the visit. All, apart from Jack (n=10) were positive, and highlighted the practices of documenting, aggregating and sharing. The following quotes are illustrative: “Great, cos it’s different from the way you learn, instead of writing down and doing clipboards, you take pictures and all that” (Kaelan); “I thought it was quite useful, because then you can share information with others and you could get different information from others” (Harmony). Additionally, Nana and Maria highlighted ideas of being connected, demonstrated by the following:

you got to see other people’s opinions... you can see how they interpret it [an object]. I like the fact they you were staying in touch with everyone, even though they were not there

[Maria, Interview Data Extract]

This response, further, stress the notion of the technology assisting in getting ideas and interpretations across, thus creating an ‘opinion space’, where multiple opinions could be heard.

Only Jack noted a tension when using these tools in the museum, since he referred to “get[ing] tedious when you have to keep doing it”, resulting in experiencing fatigue. A desire to freely explore the museum space without being engaged in task-oriented activities, seemed to be the reason behind developing such feelings. Saavi’s response to the same question was similar to Jack’s response:

sometimes you didn’t have time [to tweet], because you were looking at stuff and sharing ideas [with group]... but you do find time to see what other people were saying on Twitter

[Saavi, Interview Data Extract]

When asked, she rejected the idea of Twitter or mobile phones distracting her from looking at the objects. On the contrary, she said “I usually just look at the objects and if it’s really interesting then I tweet this!”. Her comment resembles Kevin’s response of looking for interesting things to put online. It also verifies observation notes regarding her group’s approach (Group 2) during the visit.

Among the interviewees asked, almost all (n=8) reported preference for using these tools instead of pen and paper. Typing on a mobile phone seemed to be easier, quicker and more interesting (n=4), while taking pictures and sharing this experience was appealing (n=4). In fact, the practice of taking pictures assists in “remember[ing] the exhibit and where it was” (Adam), but it also provides an alternative to writing. Only Neil could see no difference.

Furthermore, ten interviewees (n=10) were positive about having to type comments about objects whilst being in the museum. The notions of visibility and sharing of ideas within a formal school visit (Saavi), as well as the ‘permanent’ and ‘on demand’ nature of online posts (Adam) emerged. Being “in the moment” (Nana) and acting upon it immediately, i.e. “it’s really fresh in your brain...it’s just there, in front of you, you can see it, you can write it, it’s done!” (Neil) were also noted. Moreover, Jack referred to the accuracy of information provided, i.e. “you get first hand knowledge, so you know it’s right. So you won’t say stuff that’s wrong, it’s accurate”. This idea, however, was challenged by Kevin in the question “Looking back at the tweets, do you see any value in having them?”.

In this question, interviewees recognised that the Twitter stream was useful in aggregating information (n=3), as well as getting an overview of everyone’s experience in the visit (n=3). Also, it assisted in remembering things (n=4) and finding out new information (n=2). At the same time, two criticisms were expressed: the first one, as mentioned already, was related to the accuracy of information posted online and the second—expressed by Neil—was related to the lack of contextual information in online posts.

Regarding the former, to justify his point Kevin recalled a specific tweet about the ‘Lord Mayor’s State Coach’. Indeed, the analysis showed that Kevin’s group posted a tweet about this artefact, for which they got a direct reply from Group 7, including wrong information (Appendix B, Table B4 - tweet t74). No other online interaction took place in the course of the visit and one may think that this went unnoticed. However, Kevin’s criticism, as expressed in the following extract, illustrates the opposite:

Yeah, you see a lot of people what they thought about different things... a lot of Neil’s [Group 4] were very detailed as well, and it really... helped me to go and

find the places... I think at one point people were just saying... especially with the carriage, they didn't really READ the information that was on the (part of it, label) they were just putting "Oh, look there's a carriage". But I think... "Oh, no, no, no, actually if you read it it says this and then "Oh, then I'll go and look at that again...

[Kevin, Interview Data Extract]

This extract, further, indicates that a face-to-face interaction between Group 3 and Group 7 might have taken place during the visit. Also, it is clear that Group 4 was seen as a positive example regarding its contribution during the visit, pointing to participants being able to assess the quality of online posts.

Regarding the criticism expressed by Neil, he particularly referred to lack of skills of distributing and contextualising information, as illustrated by the following:

People put stuff like...."This looks really good"...they don't say anything... Here we go, that "There's a taxi (*reads the tweet*). Why do you need to tweet that, about civil rights, going off target? And it's like...Why there was a taxi? What was it for? How do I know this?

[Neil, Interview Data Extract]

This concern was a recurrent pattern during Neil's interview. This extract also stresses the author/audience relationship in an online context.

Two more questions were related to the use of technologies. The first aimed to get responses about whether using technologies made the participants feel any differently about seeing and talking about artefacts and the second was whether it made their experience in the museum different and in what ways.

Regarding the former, all except Jack (n=9) were positive and provided various reasons to justify their answer (e.g. fun, appealing, immediate, engaging). Sara, for example, acknowledged that due to technology a few students had the confidence to express their opinion, while both Harmony and Kevin referred to their audience (n=2). Harmony said they “were putting information down that would be useful to other people”, while Kevin claimed to be more attentive as he was looking for content to put on Twitter, pointing to a positive impact this activity had on him. In particular:

yes, it's made me a look at something a lot differently. I think it made me read more of the [labels] that go with it and more of what was around... **You see something else in the corner of your eye** and it will make you go “Oh, I could see something good out there and I could put it on Twitter” and then it will (all of a sudden) make you read more around the museum... (emphasis here)

[Kevin, Interview Data Extract]

It appears that for Kevin sharing content online requires specific skills, such as observation and evaluation of information, as well as identifying something original. His response, also, implies a serendipitous browsing in the galleries (see bold), which verifies the ‘floating’ type of visit his group had.

Regarding the question of whether technologies made their experience in the museum different, nine interviewees were positive (n=9). A few of the reasons provided were related to the experience created by technologies (n=5) (e.g. fun, interesting, intense, motivating, novel), or to technology helping to crowdsource/aggregate information or remember things (n=2) and getting opinions (n=2). Only Kevin saw no difference, rather he thought “it gave more of a confidence to people to use it”.

With regard to the use of Twitter and its restriction in the number of characters in the tweets (i.e. 140 characters), none of the students, apart from Kevin, refer to this as a limitation. On the contrary, Neil appeared to believe that this feature helped him in being more precise in their comments:

having to narrow it down and putting it into a straight point, it actually helped me...the thing is, the proof is, the point is etc, really quick, really short and like, 140 characters... that really helped me, it was an advantage

[Neil, Interview Data Extract]

Learning

Two questions were related to learning. The first was “What were you expecting to learn during the visit? Have your expectations been met?” and the second “What did you learn during the visit that you didn’t already know?”. Very few interviewees mentioned no (n=3) or little (n=1) expectations. The overall response for the second question was positive. All the interviewees (N=11) claimed that they learnt during the visit, and more than half (n=6) specifically referred to civil rights. Two students (n=2) drew on specific objects they saw and actions they took in the visit. As shown in the qualitative analysis of meaning maps (see Section 7.2.1.2) where extracts from this question were provided, their responses varied, from detailed ones revealing a better understanding (e.g. Neil - see Example B) or personal/affective response to the topic (e.g. Sara - see Example D), to very generic ones (e.g. Harmony) as follows: “I briefly knew that the suffragettes were suffering, but I didn’t know they were suffering as bad as they were. So, yeah, that helped to learn...”. A few interviewees (n=2) referred to things learnt other than related to ‘civil rights’. For example, Kevin referred to Blitz and Booth’s Map installation:

I learnt a bit more on certain bits, so like, the bombing in the blitz in London. I knew that they bombed them but it's good to see where they'd actually bombed...And the map with the overview, where it showed the poorest areas...because it showed the huge (masses) of people and I didn't realise how big that was before. And it showed that there was a lot of poverty in London...

[Kevin, Interview Data Extract]

Related to learning was also the question about skills developed. All, except Kaelan (n=10), referred to improving or developing specific skills. Among the responses collected were: social and communication skills (n=2), evaluation of visual and written resources to identify key points and analyse textual information (n=2), keep comments to the point (n=1), interpretation skills (n=1) and team work skills (n=2). Only Harmony referred to use of technology itself (devices/software).

In the follow up question "How did you learn these things?" responses (n= 9) included references to use of traditional interpretation media, alongside use of technology, e.g. "truly looking at the exhibits, taking pictures of the exhibits, reading through other people's posts" (Adam). Maria was the only one explicitly referring to peer interactions, while Kevin, in line with the evidence in the video data, highlighted the idea of serendipitous browsing.

Moreover, verifying other data sources, Nana's response serves as evidence that the participants were reading each other's tweets during the visit:

You know about the Black Panther? cos when we were at the museum I tried to find it, I couldn't find it...and then I saw the pictures and 'Ohhhh, that's what it is!' So, then I learnt about this thing

[Nana, Interview Data Extract]

2. Classroom lessons

The second part was structured around the classroom activities and highlighted three main areas: the use of Twitter and mobile technologies in school and online communication and participation.

In the question about creating a collage and presenting it to their classmates, all (N=11) shared positive feelings. The notions of sharing and allowing multiplicity of perspectives, as well as acknowledging an audience, are recurrent ideas among students. The following response illustrates the latter:

we had to... like create it and make something just more than just pictures. You had to make someone think!

[Nana, Interview Data Extract]

In response to the same question, the only criticism was expressed by a member of Group 4, who dismissed other groups' performance in this activity because "[they] just (flipped) the pictures and no information at all. So, we couldn't really learn from theirs" (Keith). Keith's response relates issues of value to 'authority', i.e. providing some specialist knowledge of objects seen, experience worthy of respect or interpretations that would enable the students to learn or feel more about objects. His criticism resembles the criticism by a fellow member of his group (i.e. Neil) discussed in the previous section. Due

to his group's 'focused' visit and approach in creating this collage, it might be that they attributed limited value to other presentations.

Students' responses to the questions ('What was your opinion about creating this and presenting it to your class?' and 'Do you think this was a good way to show what you learnt and your progress?') indicated mixed feelings about the tool. Three interviewees (n=3) viewed Vuvox negatively, while two others (n=2) referred to the potentials provided by an online tool in that it enables access 'anywhere, anytime'.

Regarding the lesson involving communication with the curator at the Museum of London, seven interviewees (n=7), who responded to the relevant question agreed that it was a very positive experience. Three themes emerged: the first is related to the activity assisting in the 'preparation of the visit' (n=6), e.g. "you had more of an inside to what was going to be like at the museum" (Kaelan). The second theme is related to 'bringing an expert' in the classroom (n=2), e.g. "someone with... huge knowledge of a certain subject" (Kevin). For Neil, in particular, the value lied in the curator expressing "his personal opinion as well as the facts". The third theme is related with the type of communication enabled by Twitter. Four participants appeared to appreciate the 'live' communication where "you get to ask questions... and he answered back to us straight away" (Maria). Having the opportunity to engage in this type of communication with an institution might have shifted some of the students' views about museums. This is indicated in the following:

The essence is that museums are big and they are unapproachable, while Twitter it made them more approachable and like friendly... and it was easy to ask stuff... you know when you are emailing someone, but it's not instant messaging... kind of thing that you are talking to a wall sometimes...

Finally, two interviewees referred to issues of managing this activity, e.g. size of the network, number of posts, belated replies.

Online communication and participation

Interviewees were pointed to the various activities that took place in history lessons within the project work. In the question, “In what ways were our lessons different to regular history lessons?”, all the interviewees responded affirmatively. Adam, in particular, referred to disseminating learning beyond the physical silos of classrooms and schools. His response also related to how students see themselves within their online networks. He said:

I found it easier to learn, because... I can chat to my friends but I can also take pics and upload pictures, so not only can you guys at school see it, my friends can see it as well, on my profile, which is pretty good, coz some people would look at it and ‘that’s good, where did you find that?’ and I’ll go “oh, they were in the museum”. And a lot of people say ‘Oh, we might go there, coz it looks good’...

[Adam, Interview Data Extract]

In the following question “How is this learning different compared to learning you normally have at school?” eight students (n=8) elaborated on how they perceived learning. In particular, two interviewees (n=2) viewed learning with technologies as active and three (n=3) highlighted interactions with peers and visibility of multiple opinions in their responses. The following extract illustrates this and highlights the characteristics of a shared space that allows a user enhanced visibility and his/her voice to be heard:

I liked discussions, you can say your opinions and...you will get judged and you will get people argue against your points, but at least you can get out there and say what you think about it...

[Jack, Interview Data Extract]

Students were also asked “What do you see as the value of posting these comments online, instead of, for example, raising hands and saying these face to face?”. Two (n=2) could see no difference, while Jack was the only one (n=1) to express a preference for face-to-face communication. Despite this preference, Jack also acknowledged some potential for online communication in the classroom context (e.g. instant, quicker) and interestingly, he viewed online posts as ‘deeper’, since they are written. Responses from other interviewees (n=8) revealed a number of interesting ideas. First, a few (n=3) referred to the opportunities provided to a user to re-visit and re-use content generated online, at a user’s disposal. In addition to this, the idea of a microblogging tool making students more involved in classroom activities (n=1), as well as boosting the participants’ confidence in expressing opinions (n=2) emerged in the interviews. Notably, Saavi associated confidence with the ephemeral character an online post has, which allows a user to reflect and, if necessary, delete and repost a comment. She compared this to verbal comments that have a ‘permanent’ nature, particularly in the context of a classroom activity/interaction:

when you say, you got to think of it, like, before you say it, but on Twitter if you say something but you don’t...but you change your mind, you can just erase it and then write it again. When you say it, you can’t really do that

[Saavi, Interview Data Extract]

This notion of ‘ephemerality’ as defined in the extract above, contradicts a dominant idea emerging from the interviews that content generated online is, in fact, ‘permanent’. Indeed, a number of students (n=4), perceived content generated online as a material object, which exists in space and is associated with potential uses such as reference points and memory aids. As indicated in the extract below, online content is seen as assisting in reflecting or keeping track of actions or things said, as well as resolving misinterpretations.

When you say something, you can say it and then it’s gone! You just say it and then some people can hear it differently, so they kind of think something else. When you put it down into words and type it, it’s there for a long time, so if you are “oh, what did they say?” So, you can go back and look at it. And then, that way it’s clear what you said, no one can change it...

[Nana, Interview Data Extract]

When asked “Do you see any issues in using these technologies at school?”, agreement was observed among almost all the interviewees (n=8), who pointed to users’ behaviour. Verbs such as ‘misuse’, ‘mess about people’ and ‘misbehave’ were included in their responses (n=3). When asked whether they noticed people misusing these tools during this project work, they rejected this. What is more, such technologies were viewed as ‘tempting’ (n=1) or distracting students (n=2) and as such they could potentially cause troublesome behaviour among students. A few ideas were, also, proposed on what might work well in a school context i.e. more flexibility in their use, fewer restrictions from the school’s network, periodic use of such technologies for specific units of work and a focused and structured use to avoid behaviour issues. Only one student criticised restrictions in the school network i.e. restricted access, blocked Websites, signing up for Websites.

7.2.4.2 Analysis of interviews: Teacher

In the interview the teacher was first asked to provide her view on using the technologies in the museum. She believed that the use of Twitter and mobile technologies during the museum visit made the visit interesting and purposeful. “It [Web 2.0 technologies] was obviously something that they [students] were familiar with already, which was good”, she said, but at the same time “a different way of getting them to look at it, by taking the pictures and commenting”.

Regarding the impact she saw the visit had on their learning, she referred to the post-visit activities which she found very valuable, in that “they built up to it, getting them used to what they needed to be looking at and it definitely gave them a focus”.

The teacher was also asked “What do you think that visiting the museum and using the technologies enabled the students to learn that they couldn’t have learnt in the classroom?”. Her response emphasised skills that they have developed, such as the skills of interpretation and cross-curricular skills with ICT. The teacher also referred to opportunities for personal relevance and affective engagement. The following extract illustrates these points:

They learnt about how to justify their opinion and explain their answers, because they were, it was very personal, they were able to comment from a personal point of view...

[Teacher, Interview Data Extract]

In the hypothetical question “Do you think there was going to be any difference if we were not using the technology during the visit?” the teacher viewed the element added to the

visit by the use of technology as difficult to replace. However, she added that “not everyday they get to have their mobile phones and... using them, but using them in a way that’s effective...”.

Regarding Twitter she thought that students responded to this tool very well and drew on a specific student, who surprised her because “I[she] didn’t expect him [Kaelan] to go down the route that he went down in, I[she] was expecting him to be more blasé and really not bothered...and that was nice”.

When she was asked to comment on the kind of data they collected during the visit, she acknowledged that “they did kind of get random stuff sometimes, which wasn’t completely relevant”. Her response to the hypothetical question “What would you change if you were going back to the museum?”, pointed to less structure or dismissal of the worksheets, because she saw this as making it “a little bit too restrictive for them”. Instead, she suggested directing the participants to a generic list of things. This was in alignment to her description of a regular trip to a museum, where

normally we either do not give them [students] anything to do and just tell them to go to specific (areas) and see various things or we will give them a booklet, which they inevitably don’t have to fill in and we don’t, to be honest, follow up with it

[Teacher, Interview Data Extract]

The teacher was asked to provide her views on the activities before and after the visit. She was positive about the lesson involving communication with the curator at the museum, and terms such as ‘interesting’, ‘different’, ‘useful’ and ‘really valuable’ were employed in her description. Similarly to the students’ responses, she also saw this lesson as a good preparation for them before going to the visit and she valued the opportunity given to the

students to talk to a person other than a teacher. Like the students she saw this lesson as ‘exciting’ and emphasised its ‘live’ character, where the students “were doing it at the same time and they were able to talk to someone who wasn’t there...”.

Pre-visit activities were not a standard practice for the teacher. She recognised that some of the collages produced in the post-visit lessons were better than others and pointed to the lack of familiarity with the tool as the reason. She also stressed that students might have felt overwhelmed with the various types of activities they needed to be engaged in, resulting in a few collecting irrelevant data.

Later in the interview she was asked: “To what extent do you think that during the classroom sessions they have gained any skills or improved some of their skills?” Her response was affirmative and highlighted the significance of identifying the key points and expressing this in a concise manner. Importantly, she viewed Twitter as supporting this.

Definitely understanding people can have different opinions and making judgments, I think that really helped them, because I think there’s a misconception with history... that they have to write lots... I think, having the Twitter and the fact that you can only write a certain number of characters helped that, because they had to think what their most important point was

[Teacher, Interview Data Extract]

A part of the interview was concerned with the teacher’s own perspectives around the use of such technologies in teaching. Here, she referred to reluctance and fear among teachers

who would be interested and who would find a lot of value to it, but I[*she*] think[s] there will be some who would be very dismissive... because they are scared and don't know how to use the technology.

[Teacher, Interview Data Extract]

She further, associated these feelings with lack of skills, alongside a lack of the perceived value in the use of technologies. 'Technophobia', was seen by her as the biggest challenge posed to teachers from the use of social and mobile technologies. School policies and lack of trust towards students were seen as barriers in their use.

Regarding 'trust', this was a recurrent idea in the interview. On the researcher's remark that students did not misuse Twitter, because all the tweets during the visit were relevant to the museum and their visit as such, the teacher highlighted "giving them freedom and trusting them" as key issues. It was also raised in a question regarding the teacher's professional development. Drawing on particular student who "excelled over what I[*she*] thought he [Kaelan] would ever do... He really got involved and that was surprising", she reflected as to whether she experienced anything in this project that made her change her mind about something. She said:

Trusting some of the students or...maybe having a pre-conception about some of the students... Not judging my students

[Teacher, Interview Data Extract]

The notion of trust emerged in another question related to the strengths and weaknesses of using social media in the school. She viewed breakdowns that might occur during the lessons as problematic. However, beyond this, she highlighted 'ownership of learning', 'valuing students' activity' and 'trust' as key strengths.

7.3 DISCUSSION - FINDINGS

The following section summarises the findings from the analysis of the data that was presented in this chapter. The discussion focuses on the findings per research instrument.

7.3.1 Findings from the Personal Meaning Maps

The analysis of the PMMs examined the impact of the visit on the students. It examined a number of maps in detail and provided reassuring evidence that the participants of this study did learn about civil rights. Specifically, the analysis provides evidence to suggest that the visit enhanced the degree to which the students could generate words and conceptual categories to describe their understanding of the concept (i.e. extent and breadth dimensions). It could be argued that the way the collection of PMM data was designed and implemented this would be inevitable. However, the analysis showed that a number of students drew fewer ($n=11$) or an equal ($n=1$) number of words in their exit-PMMs compared to the entry PMMs (e.g. Kaelan, Adele, Kevin, Faisal). The need for additional data was acknowledged and that was the reason interview data was also included in the analysis. As a result, an impact on the overall quality of students' understanding of the concept was further demonstrated (i.e. mastery dimension). However for one dimension of learning, i.e. the depth of the conceptual categories, the methodological design of the study did not allow this dimension to be fully tested across the whole sample. Instead, the depth dimension was tested in a smaller sample (i.e. interviewees). The test showed an increase in the ability of the interviewees to elaborate on and support their thoughts with more explanations after the visit.

Having said this, it should be stressed that students were far from experts. The analysis of the meaning maps shows that their responses—before and after the visit—were generally

brief. Taking into consideration the age group of the participants, brief responses might be expected. Students expressed their understanding about the concept with single words and short phrases and even following their visit to the MoL, most participants expressed their understanding with little detail. Crowley et al. (2000) also found that explanations after a visit tend to be brief and partial (cited in Allen, 2002, p.262), whilst students' difficulties in developing disciplinary knowledge based solely on interactions with exhibits and one another are a common finding (Pierroux, 2010; Achiam et al., 2014). The analysis also demonstrated that awareness and understanding of the term civil rights was low among the participants prior to the visit. In fact, the term itself was not part of the students' general working vocabulary. This echoes what other studies have shown, that the less visitors know about a topic, the more they tend to gain cognitively from a museum visit (Falk and Storksdieck, 2005).

The visit to the MoL was designed to broaden and change students' conceptualisation of civil rights and highlight aspects of social history. The latter is also the intended message of the exhibition design (i.e. London and the histories of its residents, impact of people in the city). Considering the analysis along the four dimensions, I would argue that the PMM 'breadth' measure best captured this dimension of learning. There was evidence that after the visit students understood the concept 'civil rights' in more ways and were more likely to talk about 'civil rights' issues including more ideas in their responses. Whereas before the visit the majority associated the concept with 'great men' or attempted to provide definitions and examples, after the visit students were slightly more likely to talk about civil rights in terms of values/emotions, groups that impacted on the movement or actions that people/groups take to impact on the movement. A number of students could also make direct links to their visit experience and a few referred to specific objects they saw and

used these as concrete examples to demonstrate their understanding both in their maps and verbal expressions. Research points to the importance of engagement with real objects (see Section 2.2.2.1) and how engagement with settings outside the classroom makes learning concrete rather than abstract (Allen, 2002, Anderson et al., 2002) and more relevant (Pumpian et al., 2006). These points were particularly illustrated by the qualitative analysis of the interviewees' maps, which was the focus of the second part of the analysis of the meaning maps.

Applying qualitative approaches to the examination of the maps provides valuable insights into students' conceptual understanding. The meaning maps emerged as responses to what the students experienced—or not—during the visit. Specifically, the textual responses in the meaning maps represented items that were viewed as important for the individual students and as such they constituted the sense and significance of the students' learning. The maps were shaped by students' prior knowledge and personal interests (e.g. Nana - race issues), choices made during the visit, as well as the social context within which they were produced. Arguably, factors such as 'interest' and 'prior knowledge' shape the interaction with the museum setting in specific ways (Falk & Storksdieck, 2005), also acknowledged within the Contextual Model of Learning (see Chapter 3, Section 3.3).

The analysis also demonstrated that some meaning maps were associated with artefacts seen while exploring the collections, interactions the students had and tweets posted. Two interviewees also made connections between their visit and their personal lives or things they had seen on TV or in the media. In addition, most of the interviewees articulated thoughts about civil rights with stronger emotion, which seemed to have been inspired by their visit. The visit's emotional impact was indicated by terms the students employed that

revealed emotional intensity (e.g. shock, hatred, inspiration). Indeed, Allen (2002) refers to research that has shown that museum learning tends to be affective and personal. It was also shown that the visit provoked a greater sense of awareness and it positively influenced and enriched interviewees' appreciation of civil rights issues. Importantly, for at least one student, a shift towards a social-historical viewpoint could be observed.

It is noted here that the way the personal meaning mapping method was used in my study limits the extent to which the analysis of the four dimensions could be applied (see Section 4.4.5.1 for a description). This is due to restrictions imposed by the setting of collecting the PMM data (i.e. the classroom). Hence, in addition to the method originally proposed by Falk et al. (1998), it was decided to interview a sample of the participants after the visit. During the interviews, the eight interviewees were only asked one open-ended question (Q: Can you please guide me through your map?). No further questions to elaborate on specific words/ideas written on their PMM were posed. This approach, compared to previous studies (Falk & Storksdieck, 2005), was seen as less intrusive and less likely to produce a possible cueing bias. However, it also restricted the amount of verbal data collected, which could provide more scope, especially for the analysis of the depth and mastery dimensions. Despite the limitations of how the method was implemented, though, personal meaning mapping, in combination with other methods, offers an interesting way of capturing changes in students' understanding and provided me with measures of learning that help to answer the research questions I set out to investigate.

7.3.2 Findings from the Group Presentations

As with the meaning maps, the analysis revealed that the collages reflected what the members of the groups experienced during the visit. Photographs taken during the visit and

to a lesser extent the tweets were used as resources in creating the collages. However, the diversity observed among the collages, both in terms of content and quality, is evidence of how well students addressed the challenges which arose during the visit and the post-visit phase. These challenges are discussed in the following paragraphs. In terms of the peer-review activity that took place in parallel to the presentations, its significance lies in that it verified that Twitter can give immediate feedback (Decosta et al., 2010; Ebner et al., 2010) and essentially that micro-posts can capture 'live thinking' (Ravenscroft, 2008).

Creating the collages challenged students' existing practices in the post-museum visit activities and required students to do more than reading a textbook and copying information. There were two specific challenges. The first, also identified in previous research (Vavoula et al., 2009; Wishart & Triggs, 2010; Pierroux et al., 2011), involved the students in deciding which aspects of their visit experience, recorded as photos, tweets or notes in the worksheet (or not recorded), were relevant in creating their collage. This involved reflection on their own practices and performance during the visit to evaluate how appropriate the 'data' they collected were and then to make selections. The analysis also revealed which resources students drew upon and how these resources were used to mediate students' understanding of the ideas involved. Photographs taken and shared during the visit and to a lesser extent the tweets were the main resources used in the collages.

The importance of the 'Picture Pool' was highlighted in this analysis. Post-visit video data indicated that the 'Picture Pool' was at the core of the groups' activity during completion of the collage. Photo sharing allowed for social interactions around photos to take place, while the photos were seen as prompts for students to recall aspects of their experience

(Sellen & Whittaker, 2010). The potential of photos to support episodic memory (Sellen et al., 2007) and stimulate conversations (Biemans & van Dijk, 2009) has been explored previously.

The second challenge involved students in deciding how to design the presentation for a particular message to be clear and accessible to their audience. The visual mode was the predominant one employed showing that allowing students to use technologies and take pictures in the visit had been of particular value for them. It not only enabled students to select objects to capture, but also allowed a different way of engaging with content from textbooks or traditional museum worksheets.

The analysis suggests that addressing an inquiry in this context was a demanding activity and highly dependent on familiarity with the process and the particular approach each group took during the visit, as well as students' skills in executing this activity (also discussed in 'Limitations', Section 8.4). It is further indicated that the process of 'connection building' between ideas and across settings was not straightforward for all the students. For example, misconceptions still existed and some groups could not overcome the challenges inherent in the process. The large number of images and lack of recorded relevant contextual information for each of them or the quality of the online discourse proved to be problematic in this process. This could have been addressed had the researcher/teacher asked the students to create a storyboard prior to creating the collage for this process to be carefully structured and sequenced. Possible limitations were the teacher's limited involvement in this activity and possibly not allocating enough time to the final resource production phase (Rennie & Johnston, 2004; Wishart & Triggs, 2010). As a consequence, only a small number of students could draw on a multiplicity of

resources to effectively communicate their meanings. This was particularly true for students representing the ‘focused’ and to an extent, the ‘hybrid’ visit.

In particular, the analysis showed that Group 3—with a ‘floating’ visit experience—presented a collage that made a good use of relevant visual material and was clearly “designed with audience needs in mind” (Zahn et al., 2010, p.505). However, this collage neither addressed their inquiry nor demonstrated a development of understanding among the students. As a result, Group 3, along three more groups (Group 1, Group 2, Group 7) with similar activity, were viewed as having a ‘discontinued trajectory’. The analysis of the two groups with a ‘hybrid’ visit experience showed that they tried to respond to the challenges which arose in creating the presentation. For example, Group 6 drew on resources other than their own (e.g. images, websites) while Group 5 re-mixed resources and created an end-product that was appealing to the audience. Both groups are viewed as having a ‘fragmented trajectory’. By contrast, Group 4, with a highly focused visit, created a collage with clear connections to the visit, appropriate use of resources, and an appealing presentation to the audience. For these reasons, Group 4 is regarded as having a ‘continued trajectory’.

Drawing on the analysis of the meanings maps and group presentations three types of trajectories could be identified: ‘discontinued’, ‘fragmented’ and ‘continued’ trajectory. These are presented in Table 7.17.

As already discussed (see Section 6.3.2), ‘floating’ refers to a visit where students were open to any experience in the museum and had few pre-conceived ideas as to how ‘civil rights’ is defined and what the museum was about or what they were meant to do. A ‘floating visit’ led to a ‘discontinued trajectory’, meaning that students were making none

or few connections with settings or ideas, while their development of understanding is limited. On the other hand, ‘focused visit’ refers to a visit where the students had a few pre-conceived ideas about how ‘civil rights’ is defined and what the museum was about.

Table 7.17 Types of visit - Types of trajectories

Type of visit experience	Pre-visit	In visit	Post-visit	Type of trajectory
Floating visit	<ul style="list-style-type: none"> • a few pre-conceived ideas as to what the museum was about • limited understanding on ‘civil rights’ 	<ul style="list-style-type: none"> • open to any experience • not clear on what they were meant to do in the museum • not following the visit plan • use of technologies 	<ul style="list-style-type: none"> • none/few connections with settings or ideas • limited development of understanding. 	Discontinued trajectory (e.g. Group 3)
Hybrid visit	<ul style="list-style-type: none"> • a few pre-conceived ideas as to what the museum was about • limited understanding on ‘civil rights’ 	<ul style="list-style-type: none"> • open to any experience • unclear understanding on what they were meant to do in the museum • partly following the plan • use of technologies 	<ul style="list-style-type: none"> • few connections with settings or ideas • build up interpretations of their visit • appropriation of messages and meanings • make it personally relevant 	Fragmented trajectory (e.g. Group 5, Group 6)
Focused visit	<ul style="list-style-type: none"> • a few pre-conceived ideas as to what the museum was about • limited understanding on ‘civil rights’ 	<ul style="list-style-type: none"> • a clear purpose of what they were meant to do in the museum • following the visit plan • use of technologies 	<ul style="list-style-type: none"> • connections with settings and ideas • built up interpretations of their visit • expanded their understanding of concepts, and made it personally relevant • appropriation of messages and meanings 	Continued trajectory (e.g. Group 4)

Yet, these students had a clear purpose of what they were meant to do in the museum. A ‘focused visit’ led to a ‘continued trajectory’ and involved students following the visit plan, expanding their understanding of concepts, and making it personally relevant. Finally, a ‘hybrid visit’ meant that the students had a few pre-conceived ideas about how ‘civil rights’ is defined and what the museum was about. These students were open to any

experience in the museum, but at the same time they were partially following the visit plan. A ‘hybrid visit’ may lead to a ‘fragmented trajectory’ (different degrees exist). What differentiates this from the ‘discontinued trajectory’ is that in the former the students appropriated resources to re-interpret the meanings. Particularly with the ‘hybrid visit’, it is noted that the properties of technologies create possibilities for expansion and continuity of the experience. Technologies offer students the opportunity to trace and orchestrate meanings made, re-mix resources, re-contextualise meanings and expand them further.

7.3.3 Findings from the post-visit Questionnaires

The analysis of post-visit questionnaire data shows that students viewed the experience at the MoL positively, with Twitter being identified as one of the highlights of the visit. As a result, the visit was rated with particularly high scores in students’ responses. The evaluation provided by the students indicates that Twitter and mobile technologies were seen as impacting on motivation and enhancing their engagement with the activities., similar to findings reported in other studies (e.g. see Vavoula et al., 2009; Cahill et al., 2011).

The questionnaire data also suggests that there was a consent among all students in relation to learning gains during the visit and a perceived development in subject knowledge and skills. In particular, the benefits seemed to be that Twitter provided the students with a tool—and a space—to share their opinions or reflect on their learning (Gao et al., 2012), while it also provided an audience for this (Crook 2012a). In fact, the practice of looking for interesting and appealing content to publish seemed to determine the visiting behaviour of a number of students. Comments or pictures posted online were also serving as recommendations for other students to find artefacts. However, not all the participants

thought that sharing comments online was useful, indicating that interpreting artefacts and publishing content online required a set of skills that students might have not yet developed.

In relation to students' views on the use of SNSs in the classroom, the analysis shows that students could now make stronger associations with learning. The analysis provides evidence that participants perceived SNSs as tools that enable the visibility of opinions and allow reflection or are associated with specific practices such as the aggregating and sharing of information. At the same time they view them as assisting in skills development, such as social and argumentation skills. This is in contrast to the views students had before the visit, as demonstrated by the analysis of pre-visit Questionnaire (QI). Specifically, the analysis of data collected from QI showed that students were making very limited use of social technologies for learning. Perhaps students were unaware of how particular applications and technological tools might be best used for learning development. Importantly, the analysis of post-visit Questionnaire data (QII) demonstrates a development in this view, and particularly social and mobile technologies were now seen as a part of the learning process. This is an important finding, as it might signal a starting point for being engaged with more sophisticated applications and uses of technologies, especially considering that tool appropriation is facilitated when the intended users have a positive experience of the tool.

The biggest limitation in this analysis was the ambiguity of the instruction in Part B of Questionnaire II. Students were asked to provide their views about using SNS in the classroom. However, it was not clear whether they should be answering the questions based on Twitter use. A few students might have related their answers to Vuvox.

7.3.4 Findings from the Interviews

The interview data shows that overall the students and the teacher were positive about this experience, while the use of Twitter during the project was further seen as bringing learning gains and development of skills.

The interview data verifies the analysis in Chapter 6 that revealed that the participants were involved in practices of live-updating, sharing and documenting their visit experience. In doing this, they were also sharing an ‘interconnected space’—not bound by the time scale of the visit—where pictures, opinions and interpretations were posted and could be stored ‘indefinitely’ (boyd, 2007) or could be ‘archived’. This space and the activity on it—visible and invisible—helped the students, to a certain extent, to engage and negotiate with the museum content and make sense of their experiences and the learning agenda of the day. Wegerif (2007) has argued powerfully for a perspective to ‘expand the spaces of learning’ through digital technologies. In the visit the ‘interconnected space’ appeared to bring an understanding of peers’ feelings, interests and actions or a new perspective in seeing things, which is essential for learning to occur. It also seemed to harness feelings of ‘social isolation’ that have been reported in the past when technologies have been used in museums (Hsi, 2003). Arguably, expanding the museum space by experiencing an online space in the context of a school visit added a level of complexity to the visit. At the same time, it enhanced the social dynamics of the visit and created a space where students could contribute and view fellow students’ perspectives.

Further to this, the online space helped the participants to ‘document their experience’ (Ebner et al., 2010) and in that way the meanings were made to exist across contexts and beyond the confines of the groups themselves. In essence, microblogging

allowed “readily available access at random times” (Kassens-Noor, 2012, p.19) for these meanings to be ‘re-visited’ and be potentially enhanced as well as for social interactions to be continued in different contexts. Being able to access the micro-posts from the museum could further involve examining patterns of past experiences. This indeed took place in the interview room, with interviewees drawing on examples from the Twitter stream to raise their points. In doing this, evidence was provided that the tweets can provide prompts to help students recall specific information or facilitate reflection on, and reviewing of, past experience. This way, learning activities could be initiated or restarted, which is at the core of the notion of seamless learning (Sharples, 2015).

Issues in relation to ‘authority’ and ‘audience’ were raised during the interviews. The use of microblogging made the students aware of an ‘audience’. The analysis also showed that students credited and could value and attribute particular weight to tweets or presentations, especially if these were seen as enabling them to learn more. Related to this point is the criticism expressed by a few interviewees about the quality of the tweets. This might be linked to the observation that engagement in microblogging brings an awareness of the ‘faults of others’ (Kassens-Noor, 2012). Having said this, identifying the faults might also suggest a limitation in terms of the perceived value of the Twitter stream during the visit, which might have affected overall participation.

In terms of the design and the implementation of the activities in the museum, interview data demonstrates that for a number of students the visit was very focused and purposeful. Only two students viewed the technology as distracting from real interactions and exploration of the collections, contrary to previous research (Hsi, 2003). Also, it seems that accommodating personal interests and preferences for what to see or where to spend time

and the lack of clear communication and distribution of responsibilities, inevitably led to some tension within groups. On the other hand, the teacher criticised the structured nature of the worksheet and the thematic focus of the visit overall.

Moreover, the notions of ‘trust’ as well as ‘openness’ and ‘visibility of ideas’ raised by both the teacher and two students in the interviews are arguably key implications in designing museum experiences with the use of mobile technologies. Also, some students raised the time factor. Indeed, as with other field trips (Kisiel, 2006; Rogers et al., 2010), time seemed to be an issue in this visit. However, it is stressed here that students were engaged in a novel experience and they were visiting gallery spaces in different temporalities. Twitter was also adding another ‘space/time element’ to this experience and due to this they might have felt they were missing things.

In relation to the use of microblogging in the classroom, a few reported that this resulted in increased confidence to participate and higher involvement (Gao et al., 2012).

Microblogging may be seen as creating a ‘comfortable platform’ for discussions (Junco et al., 2011), which may have implications for classroom practice. Web 2.0 tools appear to allow students—otherwise shy and with low participation (e.g. Saavi in this study)—to have a voice. This has been discussed elsewhere, e.g. introverted people reported that SNSs had allowed them to express themselves more confidently (OfCom, 2008).

Regarding the presentations, the interview data showed that overall the students were positive about this activity. Notions of sharing and visibility of ideas, as well as raising awareness of others’ opinions and learning were highlighted in both students and teacher’s responses. This reinforces the idea of allowing time post-visit to reflect and share learning

(Wishart & Triggs, 2010). The interview data also pointed to the students sharing an awareness about possible uses of user-generated content and Web 2.0 technologies, even though in the context of the study evidence for this was very limited. For students, online content seem to exist in a specific space (e.g. 'get out there', 'go in there'). This was a prevalent idea when referring to microblogging and online communication. In fact, the majority view online content as a 'concrete' object associated with "possibilities of action" (Barab & Roth, 2006, p.3), i.e. remember, archive. Overall, the students appeared thoughtful about the nature of verbal and online communication and it is noted that one student raised the idea of the 'networked student', who may communicate his/her learning beyond the school's physical silos.

Finally, another finding from the interview data was an awareness regarding the risks and barriers around the use of Web 2.0 technologies in the school. A concern—expressed by both the students and the teacher—is related to 'inappropriate behaviour' and points to similar finding reported by Crook et al. (2008). It is noted that the few examples given concerned students' experiences beyond the school. However, it was an interesting observation that students' views resembled the ones expressed by adults, especially when referring to notions of 'distraction' and 'inappropriate' use of the technologies. Other barriers identified by the participants were the school's firewall and breakdowns in technologies, also revealed by previous research (see Selwyn, 2006). The teacher also identified 'technophobia' among teachers as a barrier.

7.4 CHAPTER SUMMARY

This chapter consisted of four parts, each presenting the analysis of the data collected by the personal meaning maps, the group presentations, the post-visit questionnaires and the interviews. A discussion of the main findings from this analysis followed.

Overall, the analysis suggests that this was a positive experience for the participants.

Microblogging provided a tool for content to be created as well as a space for this content to be endured and for specific activity to be supported. Microblogging made it possible for students to re-visit this content and allowed them to recollect, and reflect on, their visit experience. The students were also able, albeit with difficulty, to re-use this content and re-contextualise it to make it accessible to other ‘audiences’. Therefore, the microblogging resourced the processes of connection building across phases of the activity. However, the analysis also demonstrated that this process was highly dependant on the students’ visit experience, whereas variations in the development of understanding were noted. The role of the teacher in this process was also discussed.

The following chapter reviews the aims of this thesis and revisits the two research questions in order to address these in light of the analysis presented over the last three chapters.

CHAPTER 8

DISCUSSION, CONTRIBUTIONS AND CONCLUSION

The chapter begins with a review of the aims of the thesis. It then presents the principal findings of this research and discusses the potential of a microblogging technology to support young people's visit experiences. It also discusses the implications of the research findings as well as the limitations of the thesis. The chapter concludes by describing future research directions.

8.1 REVIEWING THE AIMS OF THE THESIS

The aim of this research was to examine how the use of microblogging contributes to the students' experience during a museum visit and mediates connections between events, settings and ideas over time.

It is acknowledged in the thesis that a museum is a complex space, particularly for young people who are not familiar with practices such as navigating the museum space, engaging with questions and judgments as well as 'reading' objects. Despite the complexities, museums are powerful learning spaces that can inspire new ideas and arouse curiosity. A starting point for the work presented in the thesis was that any engagement with museum artefacts might reinforce established understandings or allow for new knowledge to be produced (Kress, 2010). Based on this, the focus of this work was primarily on investigating how the experience emerges at 'point(s) of experience' (vom Lehn, 2006), i.e.

what students actually did in the museum, how they approached and examined exhibits, how they drew on each other's experiences in exhibits and at the same time how they generated experiences for others through interactions, tools they used and artefacts they created in the museum and the classroom.

To carry out such an investigation a research design was developed that involved an interplay between many dimensions, such as temporal and spatial contexts. The design placed the museum at the core of a series of activities around a specific area of KS3 History curriculum (i.e. 'Equality and Beliefs'). An account of the design was provided in Chapter 4. The design re-conceptualised the traditional museum visit, whilst using the features afforded by technologies, in particular microblogging, to allow for components of this experience to be documented and shared, or be preserved and form new learning trails. Overall, design considerations took into account the pedagogical features of the learning activities, the characteristics of the subject matter, as well as the technological characteristics with an aim of creating a learning experience that would be "bound together to appear whole and continuous" (Kuh; quoted in Sharples, 2015, p.42).

The research design recognises, as others have (Sharples, 2009), that it is hard to determine when the learning starts and ends. Indeed, as noted in the review of the literature in Chapter 2 (Section 2.2.2), understanding learning in museums is not a straightforward task (Hein, 1998). The main way visitors make meanings is through the act of interpretation (Hooper-Greenhill, 2000); based on connections made with the past and the present, and in anticipation of future connections (Silverman, 1995). It entails continual visiting and re-visiting concepts, revising ideas, proposing new ones and if necessary, rejecting those that do not work (Rennie & Johnston, 2004). Any interpretation, in this sense, is not static, is

never fully completed and remains open to possibilities brought by new experiences and interactions. It is in this sense that an interpretation, at a given moment, can be viewed as a resource for an interpretation that may follow in the future. Given this, it is acknowledged that any learning gains students had from this particular visit to the MoL may be foregrounded in their learning efforts in the future. As such, the thesis's design foregrounds the significance of “fostering learners’ habits of mind” (Wong, 2012, p.22) and skills in identifying and appropriating resources, including technological tools, to mediate their learning activities in any learning setting.

The thesis takes up the idea that learning is mediated by artefacts and also that learning is filtered through one’s perspectives and identity, interests, prior knowledge, choices made and the resources or means that one’s culture has made available. Therefore, the theoretical perspective underlying the thesis was the Contextual Model of Learning (Falk & Dierking, 2000). This model, discussed in Chapter 3 (Section 3.3), views the visit experience in relation to meaning making and situates this in visitors' personal, physical and sociocultural contexts.

Drawing on this model and on the notion that a learning experience should be cumulative, i.e. it should build on previous experiences and in anticipation of future experiences, the thesis employed the notion of ‘trail’ (Walker, 2010) as a conceptual and methodological tool to identify key aspects of students’ encounters with artefacts in the museum as mediated by technological tools. A pre-given trail by the researcher was viewed as a means to provide the students with one way of linking individual artefacts around a specific theme. At the same time, the use of microblogging with photographs involved students creating online trails accessible by them—and others—across time and locations. Such

online trails allowed the learners to share, re-visit, review and reflect on their own and their peers' experience and could lead to new trails in different contexts.

The thesis also used the concept of 'trajectory' as a theoretical tool and at the same time as a methodological and analytical tool. Theoretically, this concept implies that the construction of knowledge and meaning is considered as an aspect of participation in social practices (Dreier, 1999). Sites such as Twitter, which were used in the research study, are part of the process of knowledge production and dissemination of knowledge and are currently shaping the media landscape. Given, therefore, that environments of knowledge making are changing and considering the new forms and content this process takes, this thesis articulated students' practices when engaged with such tools/sites in environments such as a classroom and a museum.

Methodologically, the concept of trail allowed designing, but also tracking and tracing the activity in the semi-formal setting. The concept of trajectory implied organising the data and the thesis chronologically; analytically, it implied studying the unfolding of the activities and how participants constructed knowledge both as a moment-to-moment achievement and over time. In other words, the focus was firstly on how this process was framed as a cumulative event for students. Specifically, this involved exploring whether and how connections between 'what is known' and 'what is new' (Rogoff; cited in Littleton & Kerawalla, 2012) are made and negotiated in students' interpretations and how this process is mediated by technologies. The emphasis was also on how such cumulative meanings were pursued actively, with students resourcing artefacts and technologies in a way that experiences and ideas become connected.

In the methodology chapter (Chapter 4), a detailed account was provided of how a case study methodology, combined with a variety of methods of data collection and analysis were employed to carry out this investigation. The analytic approach enabled me to view the data at different levels of detail and timescales. The analysis was predominately based on qualitative methods, but it also involved quantitative methods. The range of methods and transparency in reporting and reflecting on the findings is a key part of the contributions in the thesis.

The findings contribute to an empirically grounded understanding on how the use of microblogging contributes to a visit experience and mediates connections across learning settings. In the following section a synthesis of the findings that address the two RQs is provided.

8.2 SYNTHESIS OF THE FINDINGS

8.2.1 Re-visiting Research Question 1

RQ1: How does the use of microblogging with photographs contribute to the students' experience during a museum visit?

The RQ1 addresses the concept of visit experience in relation to the use of microblogging in a school visit to a museum. It emphasises that the intention in this thesis was not to look at what students have specifically learned; rather the focus was on how the use of microblogging with photographs made a contribution to students' learning experience. The following paragraphs summarise the main findings in relation to RQ1.

Students ‘microblogged’ their visit experience by creating and sharing micro-posts

The students used Twitter as a tool to ‘microblog’ their experience in the museum. The use of this technology made it possible for the students to create micro-posts from within the mobile application and share them ‘live’, i.e. concurrently with the face-to-face activity in the museum. It allowed them to give and get instant feedback through direct exchanges, albeit limited, whilst in the museum.

The study reveals a distinction between ‘microblogging’ as a noun/application and ‘microblogging’ as a verb/practice. A user who is ‘microblogging’ is using properties of the tool and is creating micro-posts and publishing them ‘live’ to represent and communicate knowledge to an audience or use these as prompts to reflect. This user is also using ‘hashtags’ to direct his/her posts into specific streams. Although it is acknowledged that some features were specific to Twitter when the study took place, e.g. posts of 140 characters, others have been generalised to other social media platforms, e.g. hashtags, taking/manipulating photographs. It is, therefore, important to move beyond Twitter as a tool/application or a space and consider ‘microblogging’ as a practice, reinforcing an argument made by Weilenman et al. (2013a) regarding the use of Instagram. The attention should be less on the technology as a technological infrastructure, and more on the “distinctive human activities that are made possible by this infrastructure” (Crook, 2012b, p.65).

Throughout the visit, the ‘live’ communication was afforded due to specific technological properties. The analysis showed that conveying the sense of ‘live’ interaction with their peers was important in the participants’ experience and shaped the emergence of an interconnected space (discussed below). The processes involved when the students

approached the practice of ‘microblogging’, such as when crafting the micro-posts, were documented in the analysis. The students discussed with each other and looked at resources provided in the museum’s physical context, e.g. objects, labels (Falk & Dierking, 2000). The physical space of the museum featured in the micro-posts, whereas the students were also drawn by personal interests and prior knowledge (i.e. ‘personal context’) or by the visit design. The analysis further demonstrated how the awareness of this tool providing an audience shaped the crafting of the micro-posts (discussed below). Ultimately, the micro-posts arose in and through students’ interactions in the museum and within a context that was in constant flux due to the use of this tool.

Nevertheless, ‘microblogging’ came with some tensions. Students were engaged in a novel learning activity and as such, it could be argued that methods to perform the inquiry (discussed in the ‘Limitations’) and the use of the technology itself, as well as skills to craft the micro-posts and communicate were being developed in the setting. This is consistent with findings in previous work (Coughlan et al., 2011). As a result, some students could draw on their experience and distribute ideas and interpretations in their tweets. Others, however, found this transition between their experiences of the physical environment and higher level ideas and abstractions challenging, similar to an observation by Rogers et al. (2010). This led to a few participants in the study questioning the quality of the content generated or being critical towards other students’ own efforts.

One of the key findings of this study was that blending face-to-face with ‘live’ communication in a museum setting was valued by the students. However, it also shows that to sustain the momentum and excitement created due to the live interactions, more attention is needed on how to incorporate ‘live’ communication in the design of future

experiences to support the engagement of young people with both the technology and the environment. This is particularly important when a learning design involves self-organisation of a visit and using content generated by learners themselves.

Students shared a collective experience in an ‘interconnected space’

Microblogging made live/synchronous communication possible in a museum setting among groups of young people working remotely in different galleries, where one’s opinion could potentially prompt another one’s response. As a result, the museum’s physical space was augmented and the students were sharing a space, not bound by the time scale of the visit, where content was created, viewed, shared and archived. Students were prompted to articulate their responses in this space and to reflect upon them, while this space—and the activity on it—resulted in the participants’ experiencing ‘time’ and ‘space’ differently.

It is suggested that the activity in this space enhanced the social awareness during the visit and, inevitably, had an impact on the ‘social context’ (Falk & Dierking 2000). As expected, there was evidence that the students were influenced by people in their own group.

Additionally, some evidence, albeit limited, pointed to students being directed to specific objects after viewing contributions by their peers online. It is likely that having the opportunity to talk about, and publish their experience online as they went around allowed the young visitors to make sense of their own experience by clarifying internal thoughts and questions (Cook, 2006). Microblogging further resulted in the Twitter stream offering multiple perspectives on objects and experiences, combining facts with personal insights. This could be described as creating a ‘kaleidoscope of voices’ (Reynolds et al., 2010,

p.997) and seemed to have enhanced the feeling of sharing an experience with other visitors.

Overall, augmenting the museum space with an online space arguably added another level of complexity in the already complex activity of navigating a physical space. However, it was evident that it also became a key aspect of, and shaped the students' experience. The analysis indicated that the engagement with this space and the content enhanced the feeling that this was a collective experience: the students were sharing an awareness of what was taking place among their peers in other galleries and this gave them the sense of 'little things adding up' to a cumulative experience. Drawing on Lewis et al. (2010), the "fragmented forms of micro-communication" (p.355) afforded by the tool and the emergent space, seemed to have allowed the participants "to collect lots of small bits of information about people [fellow students]... to give them insights into patterns and truths that inform future choices and interactions" (p.355). The study in this thesis emphasises the notion of 'space' that emerges from augmenting the physical space of a museum with an online space. It is suggested that this space allowed for specific types of activity to take place (i.e. share content). It also allowed perspectives on objects and experiences to co-exist and endure and importantly, it supported the learners in their connections between the museum activity and other contexts (discussed below).

Students were oriented to an audience and opened up to new communicative opportunities

The analysis reveals that features of the microblogging tool impacted on the nature of the communication in the museum, with the evidence suggesting that the students were oriented to an audience. Such orientation offered the students ways of seeing the objects that were new to them within a semi-formal context, e.g. posing by artefacts, looking for

appealing content, serendipitously browsing, taking and sharing photos. In other words, their activity and its products (e.g. micro-posts) were “designed with audience needs in mind” (Zahn et al., 2010, p.505). This aspect became a central concern for the participants and shaped the organisation of their activity. The use of microblogging further allowed the students to switch between multiple roles depending on the communicative situation they were engaged in, e.g. publishers, readers.

In this particular situation in the museum, the students did not only communicate with a specific concrete group, i.e. their peers as “members of the audience [that] can be enumerated” (Lindtner et al., 2011 p.3), but potentially with ‘invisible’ (boyd, 2009) or ‘imagined audiences’ (Marwick & boyd, 2011). Twitter is a highly social and dynamic space, as it offers the possibility to communicate with both “broad global reach as well as with personal intimacy” (Lewis et al., 2010 p.2). One interviewee in particular, situated this activity within his broader network. The analysis indicated that the formulation of the micro-posts was shaped by this awareness of an audience (see Group 3 - “Wow, look at...” tweets) and it is likely that microblogging gave them someone to talk to about their experience (Fischer, 2007).

A concern expressed in the interviews regarding crafting and publishing micro-posts might point to a concern from ‘students-as-publishers’ about posting something worthwhile to their network. Also, a criticism expressed by a few students about the performance they observed or lack of contextual information in micro-posts might indicate unfulfilled expectations over the content distributed to them as ‘readers’. It might also show an enhanced awareness of ‘the faults of others’ (Kassens-Noor, 2012). Overall, the activity in the museum (and the peer-review activity post-visit) highlighted this idea of “collective

witnessing of performance and discourse” (Lindtner et al., 2011, p.5). This idea of audience-driven content production and sharing, for which evidence was provided in the empirical work presented in this thesis, stimulates reflection on notions of young people as users, readers, publishers and members of the audience roles. It also opens the visitors up to new forms of interactions with artefacts (Hsi, 2003) within the semi-formal context, where the advent of smartphones entails the notion of ‘designing’ for an audience, especially when “the gaze of others is always present as a potentiality” (Okabe, 2004, p. 17).

8.2.2 Re-visiting Research Question 2

RQ2: How does the use of microblogging with photographs mediate the students’ connections between classroom and museum activities, both before and after a museum visit?

The research question addresses the concept of mediation and emphasises that the intention in this thesis was to understand the relationship between a particular technology and how it elicits new forms of interactions that may support learning across settings. The following section summarises the main findings in relation to RQ2.

Students were able to interweave formal visiting practices with informal technology practices

The situated activity in the museum required the students to draw on two different sets of practices: a set involving formal museum-visiting practices (e.g. navigate the space, look at objects, respond to tasks) and a set involving informal practices related to the use of SNSs (e.g. take photographs, interact online, share posts). It is suggested that the engagement with the microblogging helped the students to interweave these two sets of practices, meaning that the informal practices helped situate the formal visiting practices, and the formal visiting practices provided a more systematic way to apply the informal practices.

The pre-visit questionnaire showed that this was a group of users with established views on SNSs. As such it is acknowledged that the participants must have had specific expectations and opinions of the technology when they were asked to make use of microblogging in the museum visit. At the same time, they were a group of novice users when it came to practices entailed in a self-directed visit with the use of technologies as well as to practices around performing an inquiry (discussed in ‘Limitations’). The analysis showed that the use of microblogging during the visit pointed to considerations of Twitter as a learning or as a social tool. This resembles a finding by Weilenmann (2001) in a study examining a group of ski instructors who used a mobile awareness device called the ‘Hummingbird’. In her study the focus was on how the users negotiated issues such as where and when to use the technology, and whether to consider the Hummingbird a work tool or a gadget for social events. By the end of the study in this thesis, importantly, questionnaire data indicated that consent was reached in the students’ perception of SNSs/Twitter as learning tools.

The participants’ conduct in the museum revealed different views regarding the application’s intended use in the museum and resulted in different forms of engagement with the tool and the environment. Many students became engaged in an improvised ‘posing activity’, which other researchers view as “an embodied and performative act of art interpretation” (Pierroux et al., 2014). All groups ‘microblogged’ their experience and documented their visit via photographs and tweets while in crafting the micro-posts they mainly used informal language. It is suggested that the majority shared content primarily as a way to share awareness, rather than to communicate specific information about artefacts. These examples point to practices of documenting and sharing as a leisure activity and communicating with peers informally.

Overall, the research reported in the thesis provides evidence of tensions with ‘hybrid’ and ‘floating’ types of visit. A reason for this is believed to be the challenge students faced in switching between formal and informal sets of practices. The discussion in this section has already drawn attention to a criticism expressed regarding the informal use of the particular tool. A few interviewees commented upon others’ use of Twitter to criticise ‘inappropriate’ use, e.g. inclusion of inaccurate information. This post-visit reflection is possibly an attempt to reach an understanding about specific norms that all could agree upon regarding the use of a microblogging technology in a semi-formal setting. By contrast, the members of the ‘focused visit’ appeared to have established some norms associated with use of this technology in the particular context. They followed the visit plan and selected, interpreted, contextualised, represented and distributed content online appropriately. Their conduct resulted in them gaining authority over their audience, as reported in the interviews. Similar to a finding by Bagnall et al. (2013), their contributions were also given particular weight by other students since they were perceived as providing specialist knowledge and enabling other students to learn.

Both sets of practices were essential for the visit experience, similar to the interrelationship between scientific concepts and everyday concepts, in the sense that “scientific concepts presuppose everyday concepts in their foundation, but the scientific concepts, in turn, are able to transform the everyday ones” (van der Veer; quoted in Ash, 2008, p.19). While a body of research seems to emphasise the distinction between sets of practices within formal settings and informal uses of the technologies, in this work it is argued that the focus should be on how they complement and interweave with each other. This work also highlights that more attention is needed on how to support the learner who must be

supported to switch back and forth between practices as it suited to his/her needs and situation.

Microblogging supported the students to connect their museum experience to the classroom work

The use of the tool associated with the ‘interconnected’ space that emerged in the visit (discussed earlier) and the practice of ‘microblogging’ allowed the students to record, review and save aspects of their experience in the museum. As a result, whilst in the classroom, the students could access this content and reflect upon it to regain an awareness of their experience in the museum. The analysis suggested that the students were able to connect their visit experience to the classroom work because: (1) the micro-posts and photos were ‘concrete’ artefacts of the visit experience; (2) the micro-posts and photos were endured and accessible in other contexts; and (3) the micro-posts and photos provided ‘prompts of reflection’ (Littleton & Kerawalla, 2012) in and beyond the setting, as well as ‘prompts of recollection’. The three points are explained further in the following paragraphs.

Regarding the first point, the microblogging technology allowed the students to capture ‘episodes’ of the museum visit in a specific sequence and externalise these into trails consisting of a series of micro-posts. Each trail was associated with a specific group, while each micro-post was associated with an interpretive activity around an object/event that this group got engaged in. As such, micro-posts could be seen as ‘situated reflections’ (Pierroux et al., 2011) of the students’ experience in the setting. In essence, the microblogging appears to have allowed the students to make their experience concrete. Donald refers to this process as creating an “external memory field” (quoted in

Weilenmann et al., 2013b, p.737), where information can be preserved over time and be accessible for later use.

Indeed, the interview data revealed that students thought of the content generated during the visit not only as ‘concrete’ but also as ‘persistent’ (boyd, 2009) and associated with enhanced ‘visibility’. These characteristics, primarily afforded by the features of the technology, are seen as key in mediating connections with the classroom work. Unlike earlier experiences the students had, the students could potentially view and re-visit aspects of their experience and initiate new interactions around them (Kassens-Noor, 2012). To explain, being online meant that micro-posts were accessible beyond the temporal confines of the particular activity and contributed to the experience being endured beyond the institution’s physical location. This is similar to the photos on Instagram or the Wiki posts in Weilenman et al.’s (2013a) and Pierroux et al.’s (2011) studies respectively. Being online further meant that rather than remaining static and being associated with a specific context, micro-posts could be seen as dynamic structures that evolve and could potentially provide the learners with resources for new meanings to be made or inform future choices (e.g. presentation) and interactions (e.g. interviews).

Finally, the students were able to connect their visit experience to the classroom work because they used the micro-posts and the photos as memory and reflection cues. The participants enjoyed looking through the photos, they had interactions with photos as points of reference, while this content could be planned to use in classroom activities (e.g. collages). The analysis noted similarities in terms used in tweets and meaning maps and collages. Overall, the literature points to strong connections between autobiographical memories and visual images (Conway; cited in Sellen & Whittaker, 2010, p.76). Sellen et

al. (2007) showed that a visual ‘lifelog’ can provide effective links to events in people’s personal past and assist them in remembering the details of the original experience. Indeed, it is likely that having the micro-posts displayed on the phones’ screens, the school’s PCs/ Interactive Whiteboard or the printed paper (during the interviews) supported the students in their recollections of the visit or assisted them in reflections of their performance.

It is suggested that this process essentially led to new trails and the continuation of social interactions in different activity contexts (i.e. ‘focused’ type of visit). This is not to suggest that issues were not noted in the analysis. As discussed in Section 8.1, the research design involved an interplay between several dimensions. The analysis illustrated that being able to move back and forth and managing transitions across these dimensions posed certain threats to the continuity of the experience (Benford et al., 2009) and the conceptual understandings gained. As a result, there were variations in how participants experienced the visit, reflected in the three types of visit experience revealed, i.e. ‘focused’, ‘hybrid’ and ‘floating’.

Whereas tweets and photos might be seen as prompts for recollecting the visit experience, they were not memories in themselves or holistic representations of the experience. Instead, they were partial representations of what was experienced in the museum. Moreover, some students captured large amounts of visual resources, but the lack of contextual information restricted their use or perceived value in the classroom, similar to a finding by Vavoula et al. (2009). As a result, the analysis illustrated that their attempts to connect to meanings made in the museum and re-interpret and re-contextualise them were not always successful (e.g. ‘discontinued trajectory’). It is acknowledged that this might be because the responsibility mainly lay with the learner to initiate and maintain the flow of

learning across contexts. In a semi-formal context, however, this responsibility is shared among the learners and the teacher. The challenge, therefore, is for the educator to draw on resources generated by the learners with an aim of integrating them in the learning process and creating “teachable moments” (Sharpley et al., 2013, p.18) that may support reflective interpretation beyond the museum. As shown by the analysis, this was not an easy task, especially taking into account that the context in activities with the use of technologies is not fixed (see Section 3.3.1 for a discussion). In this study, the idea of investigating an inquiry was seen as providing a frame to open up possibilities for using such resources as cues that might lead to new learning trails and the continuation of social interactions in different activity contexts. However, the process of inquiry was not well addressed in this study. This parameter, along the role of the teacher are discussed in the ‘Limitations’ section (Section 8.4).

8.3 CONTRIBUTIONS OF THIS THESIS

This thesis’s main contributions to the fields of educational technology and museum practice as well as methodological contributions are detailed below. The implications for teachers and museum practitioners are also provided in this section.

8.3.1 Contributions to Educational Technology

There is great concern about educational provision and what counts as knowledge and literacy in the 21st century (Ludvigsen et al., 2011). Looking to the future of educational technology, Goodyear (2011) refers to two perceptible changes in the field. The first is a shift in our sense of the spaces and contexts in which education takes place, with an increasing number of learning activities being distributed across various contexts. The second is broadening our conception with regard to “educational praxis, acknowledging

the growing importance of design” (p.253). To address these two challenges, Milrad et al. (2013) call for new integrated design approaches for technology-enhanced learning. The concrete example presented in this thesis is a step forward towards addressing these challenges.

Seamless learning activities of the type illustrated in the thesis contribute to the contemporary discourse on designing and studying ‘seamless learning spaces’. Chan et al. (2006) stress the role of the technology in supporting transitions between contexts and learning scenarios, while Toh et al. (2013) view the learner as being in the position to make these transitions. The thesis demonstrated that learners may face threats in their trajectories of meaning making, which might interrupt the effects of learning in formal and semi-formal settings. It is stressed here that the key challenge for designing seamless learning experiences is to develop more effective pedagogic strategies that will anticipate and encourage the ways young people use such technologies. These strategies will also support the learner to weave and switch back and forth between practices as it suited to his/her needs and specific situations.

The thesis considered the use of a microblogging technology within semi-formal contexts and identified some of its potential that can help bridge temporal and spatial gaps between museum experiences and other contexts. The distinction made between ‘microblogging as a tool’, ‘microblogging as a space to create, share and review content’ and ‘microblogging as a practice’ point to three intertwined areas of consideration for designing learning activities across contexts. These three areas include: (1) the technological properties of the tools in use; (2) the types of activity the tools support (online or physical); and (3) the

practices associated with the tools and the contexts. I hereafter discuss some implications that the thesis has in relation to these areas.

1. Technological properties of the tools in use

The technologies need to allow the integration of different learning activities into a learning scenario, therefore they should include some functionality to facilitate the workflow between activities, i.e. storage, reuse, share content. In the study presented in the thesis two different web-based tools (Twitter and Vuvox) and iPhones were used and as a result the workflow was more complex to implement. The advent of ‘cloud computing’ promises to make this process easier. Furthermore, the technologies need to allow the users to capture both textual and visual content. Finally, allowing for content to be seen or manipulated (by individuals, small groups or class-wide) ‘physically’ in the classroom, i.e. as ‘concrete’ artefacts (e.g. Twitter stream in the Interactive Whiteboard, list of micro-posts in a paper sheet or printouts of photos), allows greater flexibility to the teacher to plan activities around this content and foregrounds different types of learning processes (e.g. reflection).

2. Types of activity the technologies support

The thesis included designs for lessons that first, considered the curriculum and second, involved various degrees of blending the use of microblogging in traditional classroom lessons. It also made possible to integrate a homework activity in the series of activities. It is suggested, like others have (Hwang et al., 2008), that the learning design may integrate activities that take place online but an important part of this should involve face-to-face interactions. It was shown, for example, that activities which drew on, and encouraged multiplicity of opinions were particularly valued by the participants. Furthermore, the

thesis provided a design for learning across contexts that integrated individual, small group and class-wide activities. However, tensions occurred in switching between these formations, activities or settings. Therefore, it is suggested that allowing time for briefing/debriefing the students or reviewing the plan with them in key points of the workflow is important for the continuity of the experience. Equally important is to provide the students support in the implementation of key activities that may take place with or without the use of technologies (e.g. collect content, synthesis and reflection on content). This may also facilitate the development of advanced skills of understanding and working creatively with media content and tools or interacting and collaborating with others, skills that are associated with Jenkins et al.'s (2006) notion of new media literacies. Drawing on the latter, it is acknowledged that the teacher has a central role in the implementation of a learning scenario. The findings of the thesis point to a recognition that the responsibility to maintain a flow of the experience in formal and semi-formal settings is shared between the teacher and the learner. As such, any learning design that makes use of technology within these settings should provide the teacher with a strong 'leadership' to drive the activities (Dillenbourg & Jermann, 2010).

3. Practices associated with the tools and the contexts

The thesis showed that designing for learning across contexts should recognise and anticipate practices (emergent or established) around the use of specific tools and in contexts. Microblogging allowed the students to use the micro-posts as 'prompts for reflection' or 'prompts for recollection', although as discussed previously more support with the specific type of activity was required. It was also found that the learners got engaged in practices such as 'live' communication, sharing and peer-reviewing as well as 'designing' content for an audience. Whereas these practices are predominately associated

with informal uses of Web 2.0 technologies, the thesis illustrated that being able to interweave sets of practices results in smoother transitions between learning contexts.

8.3.1.1 Implications for teachers

Through reporting the analysis it was shown that there are advantages in allowing levels of autonomy to the learners (e.g. through inquiry-based pedagogy) or in integrating practices prominent in informal settings. As such, the analysis also pointed to benefits in allowing students' opinions to be expressed on Twitter and including resources in the teaching other than the ones created by the teacher. That said, the need to guide the students and structure their learning was also highlighted. In essence, the teacher's involvement in the effective design and implementation of activities was clearly essential. A willingness to engage with content generated by students can offer significant insights for teachers into their students' current understanding and the means through which to offer meaningful support.

Moreover, the physical and digital manipulation of the artefacts created by the students may allow greater flexibility to the teacher. Importantly, the use of Twitter opens up learning opportunities for students beyond the confines of the classroom, e.g. communication with an expert. Finally, the thesis reveals, as noted by MacGibbon that trusting students can be beneficial: "once they sense they're trusted, kids [a]r[o]se to the occasion" (MacGibbon, 2012).

8.3.2 Contributions to Museum Practice

To date, the use of social media in museums mostly involves one-way communication strategies (Fletcher & Lee, 2012), particularly for marketing purposes (Chung et al., 2014). However, the visitors' increasing use of their own smartphones when visiting museums and the associated uses and behaviours that emerge, challenge museums to respond. New

technology-enabled models of participation through visitor generated content seem to emerge, and the interest lies in how social media can offer new frameworks for engagement with museum collections. The thesis contributes to the limited (to date) body of research which examines the use of Web 2.0 technologies in semi-formal contexts to re-conceptualise traditional practices of museum education programmes around visitor-generated content and mobile interpretation. The implications of this thesis are in relation to two areas in museum practice. These are: (1) the visitors' engagement with the museum space and the artefacts and (2) the design of learning programmes. I hereafter discuss some implications that the thesis has in relation to these areas.

1. Visitors' engagement with the museum space and the artefacts

Evidence in the thesis suggests that the use of a social technology reconfigures the museum as a social space and extends the interactions beyond a museum's physical location. 'Microblogging' the experience and directing the posts toward specific 'hashtags' is seen as having a particular potential to extend the conversation beyond this trip or the particular institution. This reinforces an argument made by Weilenmann et al. (2013a) about use of social media in an informal learning setting.

Evidence also points to microblogging providing an audience and allowing the students a different organisation of their engagement with objects through 'live' communication, publishing and engagement in practices of self-portraiture in front of exhibits. These practices have shaped the way the students have experienced the visit. It is further suggested that embedding reflective practices during the trip and after the visit and encouraging opportunities for a range of voices to be heard are important in how the students will engage with the content. A few of the participants, importantly, stressed the

importance to provide the visitors with curatorial information that convey authentic information around objects.

Furthermore, the production and sharing of artefacts that are the outcomes of students' engagement with the tool and the environment *in situ* contribute new possibilities of how encounters with artefacts might be experienced. Artefacts created during the visit and shared online became interpretive resources for the students, while in a different context they evolve and offer opportunities for visitors to reflect on them and re-use them creatively in the production of new artefacts. User generated content is—and will continue to be—increasingly available, therefore this thesis contributes to this body of research on how effective user-generated content is for learning. Since microblogging provides a tool and a space, along an audience for students to articulate their views and reconcile them with others' views, user-generated content resulting from such activities is not simply a product but also a mechanism by which learning can occur. Viewing user-generated content this way, offers scope for more exploration in museum learning.

Finally, the thesis shows that by reducing usability issues associated with technologies (i.e. complex functions in custom mobile devices/applications) and instead, opting for applications that students are familiar with and may become a ubiquitous part of the setting, the primacy of the object and aesthetic encounter can be preserved. The students may be given more time for interactions around objects and as a result, they may have more opportunities for situated learning to occur.

2. The design of learning programmes in museums

The design for learning in museums should integrate practices that are prominent among young people, i.e. 'live' communication, publishing, taking/manipulating pictures. This work recognises a shift in the visiting practices of young people that are associated with the tools available at their disposal and therefore, stresses that museum learning needs to function and integrate young people's increasingly visual, not text based, digital environments and practices. Although some museums still do not permit photography and the technology is considered by some to be an issue for museums (Hunt, 2004), what this work illustrates is that taking photos, for example, was an important practice among students. Importantly, the form of documentation afforded by the use of microblogging, that is relying on brief textual/visual records, provided prompts for reflection and recollection when being in other contexts. The thesis further provided an example on how a specific property of the tool (i.e. live communication) was used towards a learning activity (i.e. communication with the curator) that bridged the physical contexts of the two institutions. It is argued that such designs, especially if they support object-based museum learning, will contribute to designing effective programmes across these environments. This work stresses that technologies should not be introduced to a learning design or a space without adequate attention paid to how users shape practices associated with them. Also, careful consideration around ethical issues in relation to the use of social media with young people should be in place.

Finally, designs should also recognise the 'unpredictable' and the 'improvisatory nature' (Littleton & Kerawalla, 2012) of a museum visit. This has some advantages, especially, I would add, when referring to more 'expert' visitors. On the other hand, for 'newbie' visitors, unpredictability might mean entering an endless browsing in complex

settings, and if there is nothing to connect with, they are likely to think negatively about the experience and feel they failed, which will eventually result in discontinued trajectories.

8.3.2.1 Implications for museum practitioners

Through reporting the analysis it was shown that there are benefits in allowing the students to organise their engagement with objects through the use of microblogging. As a result, museum practitioners may identify objects in a gallery that may ‘lend themselves’ appropriately for posing next to them or sparking conversations and direct young visitors to these. The thesis also provided an example of digital outreach (i.e. communication with the curator) that may provide a model for engaging with schools and teachers, particularly in light of increasing costs that schools face in organising trips. This would assist the museums in connecting with new target groups (e.g. local, global). Importantly, the content posted by students on social media (e.g. questions) through digital outreach may be fed into learning programmes or the design of galleries. In essence, the thesis highlights that museums should not be extensions of the classroom. The learning programmes should draw on perspectives of real world questions and issues and frame problems or questions that the students can answer through their visits to the galleries.

8.3.3 Methodological contributions

The thesis drew on and combined a number of methods (i.e. personal meaning maps, video analysis, presentations, interviews, online discourse) and the layered analysis that accompanied this research contributes to the area of this inquiry and therefore, substantiates the findings and the conclusions reached. A key point in this analysis is that it examined a group of students throughout their visit and offered a full perspective of their

visit experience. The thesis therefore contributes to a small body of museum-related research, where the analysis of visitors' encounters with artefacts is not limited to one object.

To carry out the analysis, the thesis adapts and refines a methodology used by Ash (2007) to examine how a microblogging technology is being configured to resource meanings in a museum setting. Ash (2007) identifies three levels of analysis. In the first level, where a 'Flow Chart' provides an overview of a visit, a Flow Chart II was constructed with the aim of identifying the 'Promising Events' for more detailed examination. These events were filtered through 'Tools/Resources', that was added in this level of analysis to take into consideration the use of microblogging in the visit. The next step in the analysis proposed by Ash (2007) was to isolate significant events (SEs). In this thesis to select some SEs a set of criteria were set at the intermediate level of analysis. In addition to this, the analysis involved the creation of multimodal transcripts where Ash's tool for video analysis was combined with the multimodal approach (see Section 4.5.4).

8.3.4 Theoretical contributions

A main contribution of this thesis is the investigation of the use of technological tools within a semi-formal context, by drawing on the idea of 'trajectory' as a conceptual tool (see Section 3.2). The thesis demonstrated that technological tools mediated visitors' connections across settings and ideas, however there were variations in how participants experienced the visit, i.e. 'focused', 'hybrid', 'floating', as well as how their meanings were developed, i.e. 'continued', 'discontinued', 'fragmented' trajectories. The former terms were drawn from research examining museum learning as an informal learning

experience (Leinhardt et al., 2002b). Applying these terms in the context of a semi-formal visit is a contribution of the thesis.

This thesis further drew on the notion of trail as visitor-constructed products (Walker, 2010), and developed it further to examine the creation of online trails with the use of microblogging. Such online trails, records of a group activity or the whole class, were accessible to an audience across time and locations and they allowed the learners to share, re-visit, review and reflect on their own and their peers' experience. The thesis showed that this led to interweaving with new trails in different activity contexts (i.e. classroom).

8.4 LIMITATIONS OF THE THESIS

Teacher's role

Research reveals the teachers' important role in supporting students in developing and sharing innovative practices with technology (Mercer et al., 2010; Hillman 2014). Their role in designing and 'orchestrating' learning contexts with technological tools is fundamental, although it is recognised that this is based on their own "concerns and ambitions" (Säljö, 2009, p.316). In this project, whilst the teacher was keen on undertaking the project, she was not fully engaged with the activities and their implementation. This might be explained in terms of the challenges a teacher faces when organising a visit to a museum, because similarly to the findings from geography field-trips (Kerawalla et al., 2012), a visit to a museum involves more than 'a day out', simply putting classroom learning into practice, or gaining first-hand experience with real objects. In fact, the teacher in her interview points to reluctance among her colleagues to organise such trips.

The teacher's lack of involvement in the project work might also be due to lack of familiarity with the technologies, the nature of the project or to the researcher's involvement in the project. A few issues were noted in terms of communicating the activities to the students (i.e. visit inquiries, presentations), which might have been a limitation for the project. Similarly to concerns expressed in Littleton (2010), I recognise that teachers need support, time and space to explore the associated implications of technologies for their pedagogy and practice, which within the time constraints of this research project, might have not been fully provided to the teacher.

Researcher's role

As a researcher in this intervention I undertook many roles, including designing the intervention; observing what is going in the different settings; facilitating the sessions, where students were introduced to the specific technologies; setting up equipment; resolving technical issues in the classroom and communicating with the teacher/IT staff and staff. Switching between these roles was quite challenging and might have created some tensions related to my research practices, although the different roles were useful in maintaining an overview of the research design and a close contact with the data collected.

Inquiry Learning

Inquiry learning, described as the ability to plan, carry out and interpret novel investigations (Littleton et al., 2012), particularly when supported by technology is viewed as fostering the development of higher order thinking skills and offer learners a meaningful and productive approach to the development of their knowledge of the world (Littleton et al., 2012). In my research project students were introduced to the inquiries with the assumption that they were competent to undertake parts of this process. It is acknowledged

that this process was not sufficiently well addressed and articulated and as a result, students experienced difficulties in engaging with their inquiries, collecting appropriate evidence and interpreting data. Further to this, the students were not given the opportunity to choose their inquiry, which has been identified as an important factor in this process (Jones et al., 2013). However, the empirical evidence provided scope for further research, as discussed in section 8.6, below.

Analytic Limitations

Regarding the data collected from Twitter, it is argued that this is meaningful for the specific social context and “within the frame of interests and possibilities” (Diamantopoulou, 2008, p.103) that generated it. I acknowledge that the meanings represented online are “partial in relation to the whole of the meaning” (Jewitt, 2010, p.25) because several other modes and resources were involved in the visit (gaze, movement, design of exhibition, curator’s narratives). I further recognise that the low number of tweets considered in this study does not allow for generalisations but paves the way for further research in the field. I also acknowledge the fact that introducing new technologies into a social setting can affect methodological assumptions and practices (Hine, 2005, p.3) and can impact the broader dynamics of the social formation itself (Elavksy et al. 2011).

8.5 FURTHER RESEARCH

Technology Mediated Cultural Inquiries

One extension of the work presented in this thesis would be to explore in more detail the opportunities that social and mobile technologies provide in relation to engaging visitors in

inquiries. This approach offers museums the scope to engage visitors in an investigation (i.e. cross-cultural or culture-specific) supported by technology, which would not only support the development of understanding within the museum, but would also provide links to issues (or settings) beyond the museum that could have a personal relevance to the visitors. Through my work I have shown that it is essential to support young people in the processes of inquiry learning, as well as in their interactions with artefacts, while appropriate design and technological support are also required. Integrating social and mobile technologies in an investigation within the context of a museum visit, offers scope for visitors to create, share or archive their own content, and also to explore new modes of communication. In this way, the museum becomes a site for investigation, where visitors/ young people negotiate the construction of meaning and resource their meaning making trajectories.

Design for Serendipity

The work I presented in this thesis illustrates that students valued having opportunities for free browsing in a museum space and discovering objects or information of importance to them. It was also shown that using Twitter in the visit enhanced serendipity and triggered 'situational interests' around artefacts. There seems to be a scope to engineer 'serendipity' when designing and organising school visits to a museum, although such designs should take place alongside more structured activities. Further work could build on a recommendation system that would enable serendipity. In other words, what someone likes and what someone finds interesting based on a filtering process of curators and visitors' data. For example, using data available from school visits in a museum might produce recommendations on a mobile phone e.g. thematic (i.e. the most useful object for a specific investigation); personal interests (i.e. the most popular object in a specific gallery). The

content could be remixed conceptually and such a system would create, on the one hand, opportunities for visitors to discover new objects and on the other hand to enter new interactions and interpretive situations as they arise during their exploration.

8.6 CONCLUSION

In an era where learners participate, contribute and collaborate ‘anywhere, anytime’, this thesis contributes to the contemporary discourse on technology-enhanced learning at the interface of formal and semi-formal contexts in K-12 education (6-18s). Based on a pedagogically grounded design, it examined how the use of a microblogging technology and notions such as user-generated content and peer-led communication contributed to a visit experience in and beyond museum settings. The thesis provided a multi-layered analysis of the visit, as well as of students’ activities in the school before and after the visit. Drawing on evidence the thesis made a distinction between ‘microblogging as a tool’, ‘microblogging as a space to create, review and share content’ and ‘microblogging as a practice’. The technological properties of the tool, the types of activity it supports and ‘microblogging’ itself were key to how the visit was experienced and extended across contexts.

Essentially the thesis shows that the use of microblogging reconfigures the museum space. The learners became ‘oriented’ to an audience that provided possibilities to engage with objects in new ways. The thesis shows that students were involved in several practices in the museum, i.e. documenting and sharing content, while in the classroom they made attempts to connect to meanings made in the setting and re-interpret and re-contextualise them. This work highlights the idea of audience-driven content production and sharing, for which evidence in the thesis stimulates reflection on notions of young people as users,

readers and publishers. It stresses that interweaving of practices associated with Web 2.0 technologies with museum visiting practices offers new possibilities of interactions with artefacts within the semi-formal context. This however, created some tension in the development of students' trajectories of meaning making. These findings mark an important contribution to enhancing the understanding of processes involved when interacting with the environment and the tools. The thesis, in summary, contributes to the contemporary discourse around technology-mediated visit experiences.

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APPENDICES

APPENDIX A: Instruments for Data Collection

- I. Museum**
- II. School/Classroom**

APPENDIX B: Data Collection/Analysis

- I. Interview Data**
- II. Twitter Data**
- III. Video Data**
- IV. Questionnaire Data**
- V. Meaning Maps**

APPENDIX C: Resources

APPENDIX D: Ethics Forms

APPENDIX E: Publications arising from this work

APPENDIX A: INSTRUMENTS FOR DATA COLLECTION

Table A1 Outline of the Data Collection Phases

Phase	Dates	Setting	Topic	Data
Pre-visit	14/1 21/1 24/1	Classroom/ ICT suite	Classroom observation	Observation notes Pre-visit Questionnaire (QI)
	31/1		‘Safety on Net’ Introduction to Twitter (Create accounts on Twitter)	Observation notes
	11/2		Lesson 1: Hiroshima Bombing (incl. ‘The art of Looking and Describing’ Presentation)	Observation notes Twitter data
	14/2	Classroom	Lesson 2: Cold War (Create accounts on Twitter)	Observation notes; Twitter data Homework assignment Video data
	28/2		Lesson 4: Introduction to the Scheme of Work ‘Equality & Beliefs’ Entry Personal Meaning Maps (PMMs)	Observation notes Twitter data Video data Entry-PMMs
	7/3		Lesson 3: Live’ Communication with a curator at the Museum of London	Observation notes Twitter data Video data
Visit	11/3	Museum Bus	Museum Visit: ‘Get Up, Stand Up, Fight for your rights’	Observation notes Twitter data Video data Videos on the Flip cameras
Post-visit	14/3 18/3	Classroom/ ICT suite	Exit Personal Meaning Maps (PMMs) Creation of Collages	Observation Notes Video data Exit-PMMs Collages
	25/3	Classroom/ ICT suite	Presentations Peer-review activity	Presentations Data on Twitter Video data Post-visit Questionnaire (QII) (completed at home)
	1/4 4/4 16/5 20/5	Interview room	Interviews with the students Interview with the teacher	Audio recordings Observation notes

I. Museum

a. Observation Sheet

Figure A1: Observation Sheet for the museum visit

Observation Sheet_MoL11Mar2011

Observer's name:

Group:

(focus on a pair - with iPhone)

Names of children-in-focus:

Gallery: Expanding City/People's City/World City (select as appropriate)

	Object-in-focus (*)									
	(name)									
Action	(put a ✓)									
1.1 Pay attention to exhibit/activity - stop, look at & talk										
1.2 Focus attention for enough time to complete activity										
1.3 Pay attention for more time than is required to complete activity - read text										
2.1. Point to or ask question about exhibit										
2.2. Stop, look & discuss at length, ask several questions										
3.1 Call others over to see exhibit										
4.1 Read the text (labels)										
4.2 Do not read text (labels)										
5.1 Interact within their group about the objects/activity										
5.2 Interact with other groups about the objects/activity										
5.3 Interact with adults/museum staff/teachers										
6.1 Take picture of the exhibit										
6.2. Take several pictures of the same exhibit										
7. Watch/listen attentively										
8. Express interest in exhibit or activity										
9. Look at watch - express boredom										
10. Leave & return to the exhibit/activity										
11. Look around without particular interest										
12.1 Complete activity										
12.2 Complete activity but stay longer & make comments/ask questions										
12.3 Take brief notes/post one tweet										
12.4 Take extensive notes/post several tweets										
13.1 Look happy/excited/interested in exhibit/activity										
13.2 Look frustrated/stressed with activities										
14.1 Use of iPhones is straightforward										
14.2 Look frustrated with the use of iPhone										
15.1 Read other children's tweets										
15.2 Make comments about other tweets										
15.3. Use tweets to find exhibits/complete activity										

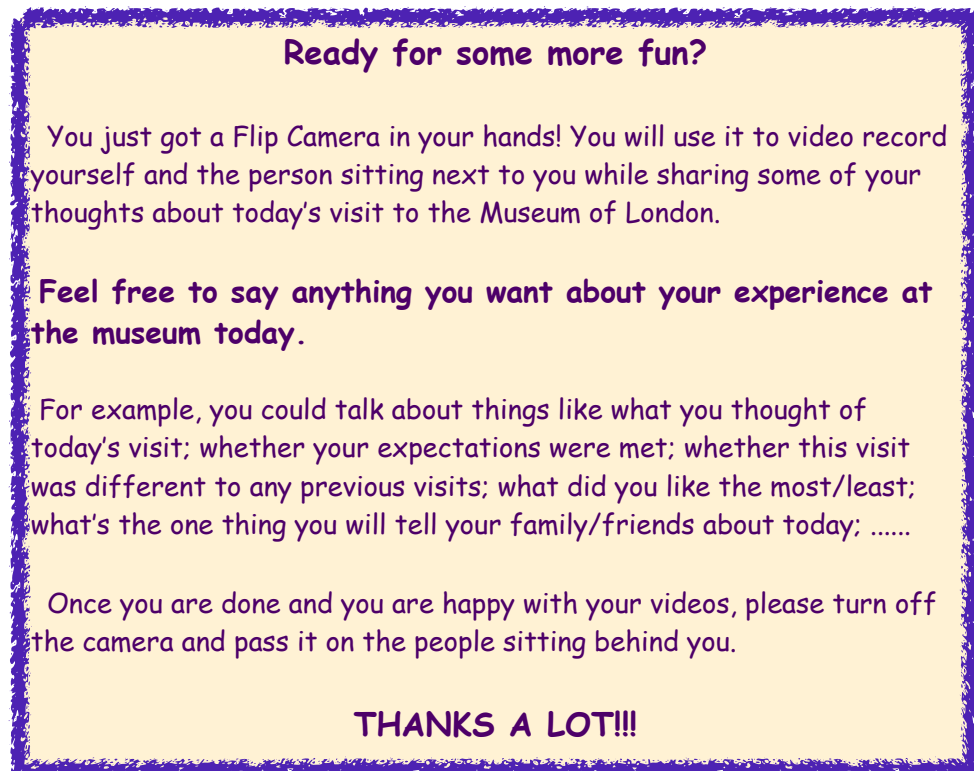
* 'stop at an exhibit': when looking for more than 5sec

General observations about activities in Gallery (name)

(Difficulties e.g. couldn't find text, lack of information, long text, difficult terminology, difficulty in understanding the activity, important elements of an activity that they couldn't find etc, comments children made (expression of feelings or motivation, links to prior knowledge, comments about the activities etc), observations of their interactions, issues with collaboration, problems with technology)

b. Video activity on the bus

Figure A2 Prompt for video activity (on the bus after the visit)



c. Worksheet









© Museum of London

Welcome to the Museum of London

'Get Up, Stand Up:
Fight for your rights'!†

† Bob Marley lyrics

Name:

11 March 2011






© Museum of London

Here we are, at the Museum of London!

London is one of the world's greatest cities; it is a place that touches each and everyone in some form, whether a **Londoner** or a visitor!

Museum of London tells the stories of London and its people. The choices people made in the past affect us all today, just as our choices will help shape the future! How people changed London; How the city changed its people? **Let's find out!**

Enjoy your visit!

What will we do here?

- explore the museum's collections
- meet people from the past
- look at, select and talk about objects that interests us
- 'tweet' our thoughts
- collaborate with each other
- make links to the history curriculum
 - use several technologies to collect evidence on an inquiry
 - use the museum's e-learning studio
 - create a video

It's time to start...

Gallery 1: 'Expanding City' Gallery i.e. #muvi1

Gallery 2: 'People's City' Gallery i.e. #muvi2

Gallery 3: 'World City' Gallery i.e. #muvi3



You are going here:

The Sackler Hall

Here are our starting points...



...and our routes


Group A: 'Expanding City' → 'People's City' → 'World City'

Group B: 'People's City' → 'Expanding City' → 'World City'

Group C: 'People's City' → 'World City' → 'Expanding City'

Group D: 'World City' → 'Expanding City' → 'People's City'

Some things to remember!

- **Look and think** carefully before choosing an object.
- You can submit up to **9 pictures in total of your selected objects** (6 in the first slot, 3 in the second slot)
- **'Think aloud'** and use the recorder to record your thoughts. There are **no right and wrong** answers.
- Feel free to **ask questions** or **speculate** when describing the objects.
- Whenever you see the symbol  in this booklet you may **'Tweet this'**.
- 'Tweet this' by using **#muvi** in all your tweets (=museumvisit).
- Use the abbreviations **#muvi1**, **#muvi2** and **#muvi3** to locate your objects.
- Each group must send a minimum of **15 tweets**.
- Each group must **reply to - at least - 4** other tweets.
- In each group one person should be in charge of the the mobile phone and one of the digital recorder and one person should take notes.
- You may swap roles in your group when you go into a different gallery.

Check list

booklet	<input type="checkbox"/>	pen/pencil	<input type="checkbox"/>
recorder	<input type="checkbox"/>	mobile phone	<input type="checkbox"/>
watch	<input type="checkbox"/>	'Help me' brochure	<input type="checkbox"/>



Tweet this!

Remember the time!

15'

Group

Your overall theme is 'Get Up, Stand Up: Fight for your Rights' Remember! This theme is linked to your history curriculum.

Your inquiry:

Before exploring the museum collections, you have 10 minutes to:






- distribute roles in your group (remember you can swap roles when you go into a different gallery)
- discuss and record your thoughts about your theme
- 'Tweet this'! Remember to use #muvi and the number of the gallery.
- use the space below for taking notes
- go back to the museum's map, on page 4, to find your way

Notes

10'

A. 'Expanding City'

This gallery presents the way Londoners protested about their rights and persuaded politicians to change the laws.

1. Go towards the **Empire Area** of the gallery and look in the low-level case containing various slavery exhibits. Find the book by Quobana Cuguano.
 - Read the caption.
 - What language was this book written in?
 - In what ways did Cuguano try to improve the lives of Africans?
 - 'Tweet this'. Remember to use #muvi1 
2. Find two other people who campaigned for the abolition of the slave trade in this gallery and write their names below.
.....
3. Choose one of these people and explain what he did in his protest against slavery.
 - What's your opinion about this form of protest? 'Tweet this'. Remember to use #muvi1 
4. Watch the slavery film.
 - What is the film about? Tweet this'. Remember to use #muvi1 
 - When did Parliament abolish the trade in African slaves?
5. From this section in the gallery, which group do you think was the most responsible for the suffering of Africans? (wealthy london sugar merchants, Caribbean plantation owners, the captains of the 'Middle Passage' ships, some other group you know about)
 - Explain your choice, by selecting one object that will help you to justify why you believe this. 'Tweet this'. Remember to use #muvi1 
6. Pick up any object (s) from this gallery that you think is related to your inquiry. Describe it and state why you selected it. **Remember to talk aloud.** 'Tweet this'. 
7. What part of this gallery was particularly noteworthy to you? Suggest an object(s) to your classmates that you think they shouldn't miss. Take a picture of it and post it on Twitter for the other groups to find it. Remember to check what the other groups suggested too.

20'

B. People's City


This gallery presents a period in London that had much political unrest. These activities focus on the fight women had to be allowed to vote.

1. Go to the **'People's Capital'** section of the gallery. In the Suffragette case find the object with which Suffragettes chained themselves to parts of government buildings as a form of protest.
 - Look at it & describe it. Why did women place this object under their clothing?
 - What do you think of this method of protest? 'Tweet this!' Remember to use #muvi2
2. Look at the whole Suffragette case.
 - Find an object that shows women's favourite colours. What were these?
 - The colours emphasised the femininity of the suffragette. Each one represented the values of purity, dignity and hope. Can you guess the value each colour represented?
3. Select three other protest items you can see in this case. Write the items' names.
.....
4. In the Suffragette case watch the **films** and write down the names of **two** women who were leading the movement. Match the names with the type of protest they undertook in their attempt to gain the vote.
.....
5. Pick up one type of protest and give **two** reasons **for** and **against** going to this extreme as a form of campaign. 'Tweet this'. Remember to use #muvi2
6. In your opinion, which method of protest used by the Suffragettes was most effective and why? 'Tweet this'. Remember to use #muvi2
7. What would you do to attract attention for a campaign for a cause that you believed in? 'Tweet this!' Remember to use #muvi2
8. What would you suggest as a slogan for the suffragettes' campaign? 'Tweet this'!
9. Pick up any object (s) from this gallery that you think is related to your inquiry. Describe it and state why you selected it. **Remember to talk aloud.** 'Tweet this'.
10. What part of this gallery was particularly noteworthy to you? Suggest an object(s) to your classmates that you think they shouldn't miss. Take a picture of it and post it on Twitter for the other groups to find it. Remember to check what the other groups suggested too.

30'

Meeting point:

Sackler Hall

- You will be now heading to the 'Sackler Hall' (check the museum's map, on page 4, to find your way).
- You have 5 more minutes to have a final look at the pictures you have taken. Remember, at this stage, your group can have up to six pictures.
- You can go back to the two galleries and take a better picture of an object if you are not happy with the one you have already.
- Check your notes and your tweets. What are your overall impressions from the galleries so far? 'Tweet this!' 

Notes

Use this space for taking notes

5'

e-Learning studio

The e-learning studio at the Museum of London is an exciting space, where technologies allow you to explore history in new ways. You will work on the computers and create a video of what you've seen and discovered today at the museum.

Description of the activity

- First, have a final look at your pictures. Are you happy with them?
- Check your tweets. You have time to tweet more if you like!
- Check what the other groups have tweeted! Retweet if you like any of them.
- Reply to at least three tweets.
- Start planning your video presentation on the basis of your inquiry. Reflect on what you saw in the galleries so far to help you in this.
- What would you like to present? Where will you focus on? You can always change/revise your ideas later!

TALES OF OBJECTS, TALES OF PEOPLE'



- Listen to the other groups talking about their initial ideas. What else would you like to find out in the galleries? Take some notes here or tweet!

60'


C. 'World City'

This gallery will help you to consider more recent protests and the way politicians have responded to them.

1. Read the first 'Race and Riots' panel and find the image of the 'Black Panther Demonstration in London' by Neil Kenlock.

- When was this image taken? Does it remind you of something?
- Which part of London was the Black Panther organisation based in?
- Explain what you think this group were protesting about? 'Tweet this' 
- How does this image make you feel? 'Tweet this'. Remember to use #muvi3 


2. Explore this section of the gallery and choose two other items that interest you on the topic of race relations.

- Write them down and explain why you chose them. Tweet this' 


.....

3. From the two 'Race and Rights' timelines, write down four key campaigns or laws, with their dates.


A.	B.
C.	D.


- Pick up one of these and explain the importance of it. 'Tweet this'. Remember to use #muvi3 

4. Find the first Race and Rights panel and read Ogi Egbuna's quote 'Legislation cannot change the hearts of men....'.

- How much do you agree with this quote? (use strongly agree, strongly disagree, unsure)
- Explain why you have this opinion. 'Tweet this' 

5. Look through the windows of the photosculpture the 'Ghetto' created by artists James Mackinnon and Tom Hunter.

- Read the caption. What is one thing that you like about this artifact? Tweet this! 

6. Pick up one object from this gallery that you think is related to your inquiry. Describe it and state why you selected it. **Remember to talk aloud.** 'Tweet this' 

7. What part of this gallery was particularly noteworthy to you? Suggest an object(s) to your classmates that you think they shouldn't miss. Take a picture of it and post it on Twitter for the other groups to find it. Remember to check what the other groups suggested too.

Meeting point: Sackler Hall

30'

e-Learning studio

- Check your notes and tweets.
- Before heading into the e-learning studio, you must 'tweet' two replies to other groups' tweets.

'TALES OF OBJECTS,
TALES OF PEOPLE'

Description of the activity

- First, have a final look at your pictures. Are you happy with them?
- Check your tweets. You have time to tweet more if you like.
- Check what the other groups have tweeted! Retweet if you like any of their tweets and reply to at least two tweets.
- Reflect on what you saw in the galleries. Finalise the theme of your video presentation you are going to create on Vuvox.
- You can go back to our visit's tweets by looking at #muvi1, #muvi2 and #muvi3 to get some help in preparing your script. You may use some in your script. You may also use other groups' pictures.

45'

Our museum visit is now over... We will be soon heading back to our school. Thank you all for your great work!

What's next?

Your overall theme is 'Get Up, Stand Up: Fight for your rights'. To complete your video and upload it online you have to add 2 more pictures to it (of objects or people) to show whether and how people are still fighting for their rights. Do you have any ideas on what you could add there? Search on the internet and share the links with your group. Tweet this!

II. School/Classroom

a.Interviews

Table A2: Interview Prototype: Students

Questions	No of responses
A. Visit	
Can you describe a previous visit to a museum? <i>[Probe: What do you recall?]</i>	11
What were the highlights of your day at the museum? <i>(or What do you remember about the recent visit we did?)</i>	9
What's your opinion of being able to take an iphone & camera with Internet connection with you during your visit?	11
Looking back at our Twitter activity, do you see any value in doing that while you were actually in the museum? Do you see any value in having these comments online? <i>[Probe: Show twitter stream during the visit.</i> Was there anything about this visit that made you remember the visit better?]	10 5
Was this better than using pen and paper? In what ways?	9
What do you think about typing comments about artefacts while you were actually in the museum as opposed to afterwards in the classroom? [Follow up: Were you able to check tweets during the visit?]	10 7
Has the use of technologies made you feel any differently, or more strongly about seeing at and talking about artefacts?	10
Has the technology made your experience different? In what way?	11
What were you expecting to learn during this visit? Were these expectations met?	11
What did you learn during the visit that you didn't already know?	5
How did you learn this?	9
Was this visit meaningful to you?	7
Did you learn anything new about 'civil & political rights' after the visit? <i>[Probe: e.g. When you were creating and/or presenting the collages? How did you find this out?]</i>	9
Can you tell me how you decided who would do what during the visit? <i>[Probe: Was there a person in charge? What did he/she do?]</i>	11
Do you think it went well overall? If you had the chance to go again and do similar things, what would you do differently next time?	11

Have you behaved differently in the visit to the way that you normally behave during school visits? In what way?	8
Can you guide me through your meaning map? <i>[Probe: Show meaning map. Explain what do you mean & why you wrote these words/terms/elaborate on the meaning map. Is there anything else you'd like to add?]</i>	8
Did you learn a new skill out of this project?	10
B. Classroom Lessons	
What's your opinion about creating the collage and presenting it to your classmates?	10
How do you view this method as a way to show your learning process/ progress after a visit and your talent in creating something?	9
Which activity did you like the most? Why? <i>[Probe: Remind classroom lessons e.g. Communists Vs Capitalists; Hiroshima Bomb; Communicate with the museum's curator before the visit; Create collage & vote for our favourite collage]</i>	5
In what ways were our lessons different to regular history lessons?	11
How is this kind of learning different to what you do at school?	8
What do you think is the value of using these tools in the classroom? For example what's the advantage of having comments posted online compared to saying these things in the class? <i>[Probe: for example, commenting online instead of putting hands up]</i>	11
Do you prefer studying and learning with new technologies over traditional ways of learning?	8
Do you see any issues in using them at school? <i>[Probe: Why schools are not using such tools?]</i>	10
What - if something - would make you participate more actively online?	10
What did you think of our communication with the museum person over Twitter before the visit? <i>[Probe: Did this make you feel better prepared for the visit?]</i>	7
Anything else you would like to tell me (ideas, problems, issues, suggestions)	10

Table A3: Interview Prototype: Teacher

Questions

A. Museum Visit

How do you think the visit went?

[Probe: Overall opinion about the visit]

In your view, what was the value of using new technologies in the museum?

What would have been different if we had not used new technologies during the visit?

[Probe: Draw on experiences from other visits]

**What kinds of impact [on learning] on students do you think that the visit had?
What did visiting the museum enable the students to learn that they couldn't have learnt in the classroom?**

If you could choose just one thing what would you say was the most important benefit to your class from this visit?

What skills do you think the students developed or learned in the visit?

Did she see any issues with the use of iPhones/Twitter?

[Probe: Person in charge? Typing & looking at the objects the same time. Is there any way that collecting evidence could become more collaborative?]

Do you think the students worked well in their groups?

What is your opinion about the degree of structure provided in the worksheets?

If you had the chance to do the visit again, what would you do differently?

If a colleague asks your opinion in preparing a similar visit to a museum, similar approach, what would you say to him?

What do you think of having to create a collage after the visit?

[Probe: How well do you think the children managed this task and the evidence/data they collected from the visit?]

Do you think this kind of visits would be manageable within the school?

B. Personal/Professional Development

What were your expectations out of this project? Were they met?

How did you benefit from this project, if so? What is the specific value to you of doing this? *[Probe: What is the value in the short term/long term?]*

What, if anything, did you experience in this project that made you change your mind about something?

[Probe: Is there anything you feel more strongly or less strongly about since this project?]

Is there anything you didn't like at all and it could have been done differently?

What were the challenges that this project posed to you?

Probe: Has finding time to fit in meetings with me or adjust your schedule/history lessons been difficult? Any issues in carrying out this project in terms of school requirements?

C. Perceptions on students' learning/engagement

To what extent do you think pupils will have gained facts and information during the project?

To what extent do you think that your pupils will have increased or gained skills during the project?

Have you any specific examples of students who you have noticed have improved/more engaged?

D. Lesson with the museum curator

What your thoughts are about this?

What was the value of having this activity prior to the visit?

[Probe: Refer to her comment once the activity was done - 'good for post-visit too']

Do you see any issues of doing this in the school? Do you think other teachers would be interested in having this mode of communication with a museum?

E. Views on museums and technologies

What in your view are the strengths/weaknesses and challenges of using museums as places to learn?

Why do you use museums –if so? In your opinion, what is the value of taking students to museums?

[Probe: children's response on interviews on non-visiting patterns]

What's your approach to a visit to a museum? (before, during, after)

What are your views on the strengths/weaknesses & challenges of using new technologies/social media at school/in history?

What challenges does the use of social media/iPhones pose to you as a teacher?

What would increase your confidence to use such technologies with children?

Anything else you'd like to share (ideas, suggestions, problems, issues)

c. Pre-visit Questionnaire

Questionnaire I

This is a questionnaire to help me with my research.

It's **not** a test, so there are no 'right' and 'wrong' answers - just answer each one as honestly as you can. I am interested in what **you** think, so please don't share your answers with the people around you.

There are four parts for you to answer. Please spend about 5 minutes on each one, so you have enough time to answer them all.

Please tick ✓ one circle in each statement or complete the statements.

Thank you very much for helping me!

Koula Charitonos

Part A: Information about you

1. Your name is:

2. You are: Male ☐ Female ☐

3. Is there a computer at your house?	Yes <input type="radio"/> No <input type="radio"/>
4. Do you have your own computer e.g. laptop, netbook?	Yes <input type="radio"/> No <input type="radio"/>
5. Do you have internet at your house?	Yes <input type="radio"/> No <input type="radio"/>
6. Do you have a mobile phone or an iPhone/Blackberry or any other device that is also a mobile phone?	Yes <input type="radio"/> No <input type="radio"/>
7. Do you have an iPod or an mp3 player?	Yes <input type="radio"/> No <input type="radio"/>
8. A game console like an Xbox or a Play Station?	Yes <input type="radio"/> No <input type="radio"/>

Part B: You and use of the Internet

I'm interested in the kinds of things you do when you use the Internet.

Part B aims to gather information regarding your use of the Internet.

1. On average, how often do you go on the internet and use it for a specific set of tasks or activities?

<input type="radio"/> several times a day	<input type="radio"/> once per week
<input type="radio"/> about once a day	<input type="radio"/> once a month
<input type="radio"/> a few times per week	<input type="radio"/> don't know

2. On average, how many hours per week do you spend using the Internet for a specific set of tasks or activities?

<input type="radio"/> over 40 hours per week	<input type="radio"/> 3-6 hours per week
<input type="radio"/> 21-40 hours per week	<input type="radio"/> 1-2 hours per week
<input type="radio"/> 10-20 hours per week	<input type="radio"/> 0-1 hours per week
<input type="radio"/> 7-9 hours per week	

3. How comfortable do you feel using the Internet?

<input type="radio"/> very comfortable	<input type="radio"/> quite uncomfortable
<input type="radio"/> quite comfortable	<input type="radio"/> very uncomfortable
<input type="radio"/> neither comfortable nor uncomfortable	

4. Do you ever access the Internet using:

<input type="radio"/> your mobile phone	<input type="radio"/> Xbox or Play Station
<input type="radio"/> your portable gaming device like P-S-P	<input type="radio"/> iPod or mp3s players
<input type="radio"/> an electronic book device like an e-book (e.g. iPad or Kindle)	<input type="radio"/> other

5. Please tell me if you ever use the Internet to do any of the following things.
Did you happen to do any of these in the last 3 days? (Put one tick in each column)

	Yes	No	Don't know	Did in the last 3 days
a. play games online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. chat with friends online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. listen to music online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. send/receive emails	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. find information online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. browse (without specific purpose)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. watch video clips online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. use a social networking site (e.g. facebook)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. share something online that I created myself, such as my own artwork, photos, stories or videos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. create or work on my own online journal or blog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. create a web page	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. read an online newspaper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. post comments to an online news group, website, blog or photo site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. find/read resources for one of my lessons at school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No	Don't know	Did in the last 3 days
o. visit Virtual Worlds like Second Life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. use Twitter or another service to share updates about yourself or to see updates about others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. take material I find online — like songs, text or images — and remix it into my own artistic creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part C: You and use of the Social Networking Sites

Social Networking Sites are sites where you can create your profile, find your friends view pictures and post comments etc. Examples of such sites are Facebook, Bebo or Hi5.

Part C aims to gather information regarding your use of Social Networking Sites.

If you never used such a site, please go to Part D.

1. Have you ever created your own profile online that others can see, like on a social networking site?	Yes <input type="radio"/>	No <input type="radio"/>
2. Is your (online) profile visible to anyone?	Yes <input type="radio"/>	No <input type="radio"/>

3. How many social networking sites do you currently have a profile on?

<input type="radio"/> 4 or more	<input type="radio"/> 1
<input type="radio"/> 3	<input type="radio"/> don't know
<input type="radio"/> 2	

4. Which social networking sites do you currently have a profile on?

.....

5. On average, how often do you visit social networking sites?

<input type="radio"/> several times a day	<input type="radio"/> once per week
<input type="radio"/> about once a day	<input type="radio"/> once a month
<input type="radio"/> a few times per week	<input type="radio"/> don't know

6. I'd like to know the specific ways you communicate with your friends using social networking sites. Do you ever... (please tick ✓ more than one, if applied)

- ☐ use these sites to make new friends
- ☐ use these sites to stay in touch with friends you see a lot
- ☐ use these sites to stay in touch with friends you rarely see in person
- ☐ use these sites to make plans with your friends
- ☐ post messages to a friend's page or wall
- ☐ send a bulletin or group message to all of your friends
- ☐ send private messages to a friend
- ☐ wink, poke, give 'e-gift' or kudos to your friends
- ☐ post comments to a friend's picture or blog
- ☐ post pictures of you and your friends
- ☐ post music videos
- ☐ post videos or artworks you've created
- ☐ share links with your friends (music, news etc)
- ☐ search for information
- ☐ other
- (.....)

7. Why do you like using social networking sites?

.....

.....

.....

8. Do you see any value in using social networking sites?

.....

.....

.....

Part D: You and museums

Part D aims to gather information regarding your views on using and visiting museums.

Please indicate the extent to which you agree or disagree with the ideas expressed in each statement. Please tick ☒ only one answer for each statement.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1. I like visiting museums.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I have visited museums in my free time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Museums are boring.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Museums are good places for learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I like looking at museum objects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Some things are so hard to understand when visiting museums.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I usually feel bored when visiting museums.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I find it difficult to talk about museum objects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I find it difficult to make sense out of my visit to a museum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Visiting museums has been very inspiring for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. In museums I always discover some new information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. The museum is a good place to learn in a different way to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. A museum visit is a good chance to pick up new skills.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I would like to visit museums more often.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Museum visits give me lots to think about.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. What would make a visit to a museum meaningful for you?

.....

.....

.....

.....

Thank you very much!!!

d. Post-visit Questionnaire

Questionnaire II

My name:

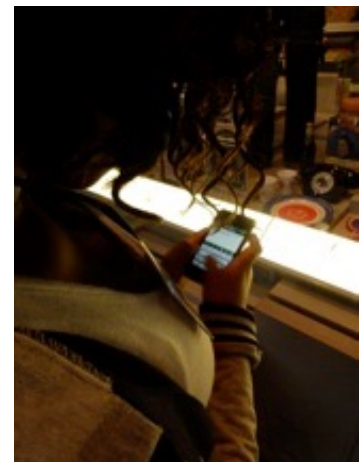
I'm interested in finding out what you think about our museum visit and the activities we did in the classroom before and after the visit.

😊 This is **not** a test!!! 😊

There are no 'right' and 'wrong' answers - just answer each question as honestly as you can. I am interested in what **you** think, so please don't share your answers with the people around you. What you write is just for me and my research and will not affect your marks in any way.

Please tick ✓ one circle in each statement or complete the statements.

Thank you very much for helping me! 😊 😊 😊



1





A. Museum Visit

The following questions are related to your visit to the Museum of London.

1. Please indicate the extent to which you agree or disagree with the ideas expressed in each statement.
Please **tick one answer** for each statement.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1. The visit has given me lots to think about.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I felt bored during the visit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I discovered some new information during the visit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. This visit made school work more inspiring.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Using new technologies during the visit was confusing to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I would visit the Museum of London again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The museum was a good place to learn in a different way to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I would follow Museum of London on Twitter and/or Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. This visit was a good chance to pick up some new skills.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. The visit has given me a better understanding of the subject 'civil and political rights'.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Reading my classmates' comments about artefacts was pointless.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. It was difficult to make sense of this visit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I enjoyed the stuff I did during the visit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Museums might be more interesting than I thought.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I liked sharing my comments about artifacts online.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Some things I saw were hard to understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Using new technologies during the visit made me feel more engaged with the stuff I was doing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. This visit was more interesting than my previous visits to museums.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Museums are boring.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I have learnt new things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. How would you rate this museum experience? (out of 10 - please tick the box)

	1 2 3 4 5 6 7 8 9 10			1 2 3 4 5 6 7 8 9 10	
Terrible	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Wonderful	Isolating	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Social
Frustrating	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Satisfying	Complex	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Simple
Dull	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Stimulating	Boring	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Fun
Meaningless	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Meaningful			

3. Suppose you are given the opportunity to use new technologies again (e.g.iPhones,social networking sites) during a future visit to a museum with your school. How much do you agree or disagree with the ideas expressed in each statement: (please tick one answer for each statement)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1. I would definitely like to use them again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. It would make my experience interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It would help me understand artifacts better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. It would make my visit more meaningful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. It would help me learn new things during my visit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. It would have no value at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. It would make my visit more social.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. It would help me share what I had learnt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. It would make me reflect on what I did during the visit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. It would make my visit more inspiring.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. I'm interested in the objects you looked at and talked about during the visit. Could you write a short description of **how you decided to select specific objects**? (reasons might include pictures viewed before the visit, object's appearance, labels, friends' suggestions or their tweets, the inquiry assigned to your group and others)

5. What was the one thing that you liked the most in this visit? Can you think of any reason?

6.What was the one thing that you liked the least in this visit? Can you think of any reason?

7. If there was one thing you could change in the visit we did, what would that be? (please give details)

B. Classroom sessions

The following questions are related to the use of Social Networking Sites SNS (i.e. Twitter, Ning and Vuvox) in your classroom during your history lessons.

1. **Please delete as appropriate and complete the statements:**

a. I think that doing these activities with social networking sites are useful/not useful (delete as appropriate) because...

b. In my opinion such activities are important/not important (delete as appropriate) to do because....

c. I think doing such activities regularly could help me to....

2. Is there anything else (ideas, problems, suggestions) you'd like to tell me about the use of social networking sites (i.e. Twitter, Vuvox) and/or mobile technologies at school?

3. Please indicate the extent to which you agree or disagree with the ideas expressed in each statement. Please tick one answer for each statement (SNS= Social Networking Sites i.e. Twitter, Vuvox)

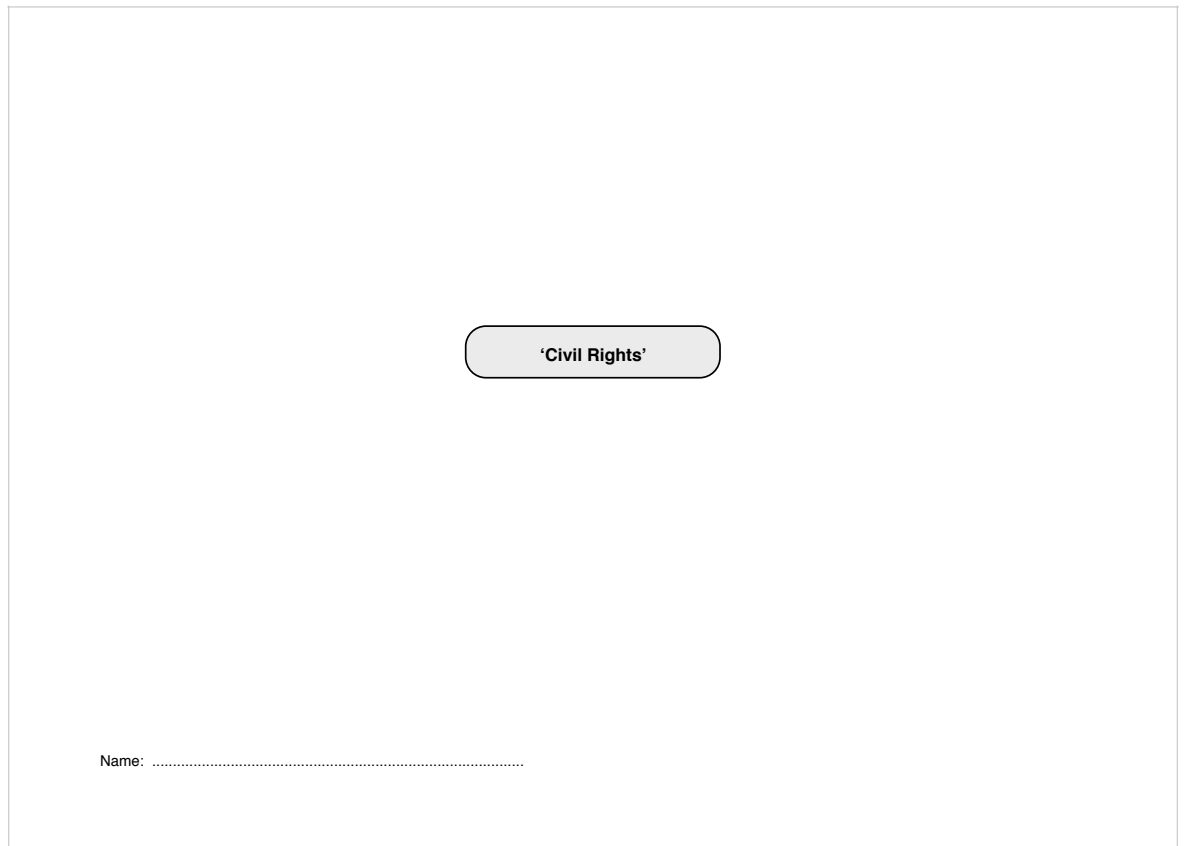
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1. I found the activities with SNS very interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I think the activities on SNS were important.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. While I was working on the activities with SNS I enjoyed them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Doing the activities with SNS was fun.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I enjoyed doing the activities with SNS very much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I believe doing the activities could be beneficial to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I thought the activities with SNS were very boring.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I would be willing to do these activities again because it has some value to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I thought the activities with SNS were very interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I believe these activities could be of some value to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I would describe the activities as very enjoyable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. I'm also interested in how you used these SNS outside your classroom. Could you write a short description of **how you used them at home?** (e.g. whether & how many times you were logging in, what were you doing etc)

😊😊😊 Thanks a lot!!! You are a star! 😊😊😊

e. Personal Meaning Maps

Fig. B1 Personal Meaning Map Prototype



A prototype of a Personal Meaning Map. It consists of a large rectangular frame. In the center of the frame is a light gray rounded rectangle containing the text **'Civil Rights'**. In the bottom-left corner of the frame, there is a label **Name:** followed by a dotted line for text entry.

'Civil Rights'

Name:

APPENDIX B: DATA COLLECTION/ANALYSIS

I. Participants

Table B1: Outline of the visit groups and inquiries

Groups	Members	Inquiry
Group 1	Adam <u>Kaelan</u> <u>Faisal</u> Benny	How do people bring about social change?
Group 2	Saavi <u>Harmony</u> Lance	Which methods do people use to remove inequalities in society?
Group 3	Kevin <u>Adele</u> Heather Sabina (absent)	Which methods do people use to remove inequalities in society?
Group 4	<u>Neil</u> Keith Darren	How do people change the societies they live in?
Group 5	Rita <u>Nana</u> <u>Giles</u> Gareth	How do people change the societies they live in?
Group 6	<u>Maria</u> <u>Sara</u> Elisa Harriet (with a teacher assistant)	How did people get the rights we have today?
Group 7	Jack <u>Julian</u> <u>Tina</u> Samantha	How did people get the rights we have today?

* The underlined names point to the students who signed-in on Twitter with their accounts during the visit

II. Data from the Interviews

Table B2: List of the interviewees

Interviewees		Date	Duration
Students			
1	Adam	1/4/2011	16’
2	Saavi	1/4/2011	14’
3	Nana	1/4/2011	20’
4	Kevin	4/4/2011	23’
5	Kaelan	4/4/2011	12’
6	Jack	4/4/2011	13’
7	Harmony	4/4/2011	8’
8	Neil	16/5/2011	32’
9	Keith	16/5/2011	
10	Maria	16/5/2011	26’
11	Sara	16/5/2011	
Teacher			
12	History Teacher	22/5/2011	65’



Table B3 Symbols used in transcripts

Symbol	
.	the full stop indicates a 'sentence-ending' intonation
,	the comma indicates that the interviewee has more to say, continued utterance
?	the ? indicates an upward 'question' intonation
(words)	A guess at what might have been said if unclear
()	Unclear talk
...	noticeable pause (of 2-3 seconds)
<u>word</u> WORD	Underlined words indicate louder sounds, capitals are louder still
A: word [word B: [word	Square brackets aligned across adjacent lines denote the start of overlapping talk
heh heh heh	heh' indicates 'little laughter' sounds


III. Data from Twitter

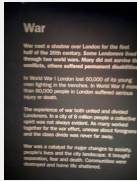


Table B4 Tweets posted during the visit



time	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
1						In the bus wiv all the freshie from mk goin london x	
2			@Maria abouuuuuut !!				
3	Done ;) !!!						
4						Hii	
5	Good :)						
6							#muvi all done!!
7					@Maria freshie lol		
8		Our expectations are that it will be interesting					
9							It will be interesting
10						I expect to learn in a new way, more of an active learning, I am looking foward to this!	
11				It will be interesting and helpful for us to understand protesting in more depth! Neil, Keith & Darren.			
12							#muvi I expect to see lots of new things
13	#muvi good :)						
14		For it to be interesting					



15	#muv1 my expectations is that we will learn how to use tweet deck #muvi1 by fahmi and benny x						
16	I expect to see some interesting things :)						
17					Can't find the peoples city lol we r lost		
18					Learn something new every day wembley stadium was opened 1923		
19					http://yfrog.com/h23rovpj dat a taxi		
							
20		We found. Some wood :)					
21						http://yfrog.com/h0d88etj race and riots	
							
22		Pleasure hardens dummies staring @ us :/					
23				#muvi2 the suffragette method was peaceful, posters are a method of protest. This appealed more to lower class as it was in every day life.			

24					Looking at the suffragette badges and pins the ones they wore this to fight for their rights brave women		
25		Pleasure garden is peng					
26						#muvi3 they were protesting against racists, they were fighting for black rights	
27					http://yfrog.com/h4ftepdj		
							
28						Fighting for black rights, fighting for there freedom, because they believed everyone is equal	
29				#muvi2 in this exhibit there are many tools of that they used for protest eg: huge chain belt. Small hammer's 4 smashing window's and more.			
30						#muvi3 angry, frustrated, happy because they are fighting for their rights	
31						Harriet feels happy for the fact they are fighting for there rights!	

32							The riots and race in 1958 Nottingham riots attacked black people in 1976 laws where strengthened on discrimination
33		U can't our taxies b dat peng?					
34						It makes me feel frustrated that the people had to fight in the first place!	
35					#muvi1 I think the war really helped women get independence so u go girls lol		
36	http://yfrog.com/h2jikmij sufferjetts !! &						
							
37							Gedi likes this
38						#muvi3 the two interesting objects that we choose were the trim phone nd modle village x	
39					@Sara who had to fight ?		
40	http://yfrog.com/h3744srj #muvi good use of sufferjetts !!!						

42				#muvi2 the violent method of the suffragists was a spark which got more people involved while posters were more long term.			
43	http://yfrog.com/h7uldugi#muvi						
							
44	#muvi1 this is a good place and it shows all the brave and bold people that went to war !!!						
45							#muvi3 I think she is right because laws won't change people's mind
46				#the films are very useful because it showed us a visual impact than reading information.			
47							http://yfrog.com/hsbimjj
							
48					2		
							

49				#muvi2 the phrase is Courage Constancy & Success!			
50						We are exploring the toys used by children in the past, it shows what used to entertain them, while in this time we use iPods, tv etc	
51		These houses r seriously cute					
52		Found peng carriage it's gold					
53		We found 2009 bb					
54							Looking at. Thee susanne schaefer
55		We enjoy the games cuz they help us learn					
56					Looking at all the fashion in the 70s it was actually quite good		
57	http://yfrog.com/h2geczwj#muvi						
							
58	http://yfrog.com/h2nukmsj#muvi						
							

59	#muvi1 my expectations is that we will learn how to use tweet deck #muvi1 by http://yfrog.com/h0qd9moj						
							
60	http://yfrog.com/gygbmtj #muvi						
							
61		We like slappin the interactive table thingys					
62			Harriet's found new loove !!				
63				#muvi3 A British black panther demonstration, Brixton, 1970			
64				#muvi3 the protest with the 'keep Britain White' this is a protest not a good one but someone is still trying to say something.			
65						@Adele lol Adele xx	
66			Look @ these really cool light up models ... :D http://yfrog.com/h69ikqxj				

							
67			WOW LOOK @ THE MAYORS CARRIDAG E ;D http://yfrog.com/h7hh8wj				
							
68					#muvi3 this guy called Olaudah campaigned for the end of the slave trade		
69							Nearly the end of our journey
70				#muvi1 Quobna Ottobah Cugoano he improved the lives of African's by setting up school's			
71				#muvi1 Mary seacole she was rejected because of the colour of her skin			
72				#muvi1 publishing a book is a good way of protesting. But It was a lot harder than today.			
73				#muvi1 the film is about slavery in the British empire era. Slavey was abolished in 1834			

74							@Adele thats the queen carraige you foofl
75	@Neil cause they are trin to get ther point acros bu stil it a harsh debat kep britan white we shud let peple in no mater about thei race						
76				@MuseLearn 1834!!!!!!			
77				@Nana yeah I looks good but would you where it, while going ou with your mates!			
78	@Nana yh because the men were at war but still they shouldnt of had to do all the work						
	15	11	5	14	2	11	11

Table B5 Examples illustrating the content analysis of tweets

1	[Looking at all the fashion in the 70s] [it was actually quite good]	EXP	EVA	InT
2	@xxxxxxxx [yeah] [I looks good] but [would you where it, while going ou with your mates!]	JUD	EVA	INT and AFF
3	#muvi1 [publishing a book is a good way of protesting]. [But It was a lot harder than today].	RES	EVA	EVA
		InT		
4	#muvi3 the protest with the ['keep Britain White'] [this is a protest not a good one] [but someone is still trying to say something]	RES	INF	EVA
		InT		
5	[Learn something new every day] [wembley stadium was opened 1923]	REF	ILL and INF	
6	#muvi1 [I think the war really helped women get independence] so [u go girls lol]	RES	InT	JUD and AFF
7	[http://yfrog.com/h23rovpj dat a taxi]	ILL		
8	5. #the [films are very useful] [because it showed us a visual impact than reading information]	RES	EVA	ARG and EXP
		InT		
9	@xxxxxxxx [who had to fight]?	RES	INT	

IV. Video Data

Table B6 Flow Chart I

Time	Exhibit	Overview	Content themes
	Walk to the galleries through the cafe. Head into People's Gallery	K. leads, he has the worksheet. Bluetooth is attached to him. A. has the iPhone. Walk together (Problem with sound)	Navigation
A. People's City Gallery			
01:54-02:40	Colonial Exhibition	Group together. Looking closely. K. leads with a question; A. responds; K. challenges, H. new question. K. responds (Problem with sound)	Questioning Point out to the display; read label
07:56-10:26	Booth's Map Installation	K and A lead - zoom in and out images on the installation. H. prompts to leave. Excitement	Conversation about images and map Questioning Prior knowledge Physical environment
11:00-12:05	War section	A leads. Looking closely. Personal interpretation - reminds them of dressing up	Personal interpretation Draw on personal experiences
13:25-14:07	Brasserie	Mix with two students from another group & discuss about the display. Very excited	social environment cakes
17:20-19:38	Selfridges Lift/ Cinema	only K. and A., H joins later K. leads; "Q. What did you think about it?" K. prompts to pick up a nice picture from this gallery and tweet about. A. hesitates	Navigation Tweet - 'wow factor' social environment
B. Expanding City Gallery			
19:38-20:40	Walk along timeline	Heading towards the Expanding City Look and discuss the timeline	Point out the timeline - physical environment evaluations prior knowledge Navigation
20:40-23:05	Pleasure Gardens	K. leads; poses questions; "I'm confused" Not much talk. Some comments on the window. Amused	emotions No use of labels
23:05-23:55	Underfloor Cases	Hesitate to step on that. K. asks questions. H. small steps on it. All cross twice	Physical environment emotions Questioning
23:55-24:40	Exhibit Map of London 'Great Fire of London'	Discussion between H and K. Read labels, H. touches frame. Questioning	read label/gestures prior knowledge Great Fire of London social environment pictures
24:40-27:00	Map British Empire	only A and K. H looks at a different exhibit. Joins later. K leads; Q1 "What's this?"	prior knowledge maps empire; products; countries; slavery
27:10-28:14	Painting	H leads. H. and A. talk about how realistic people are. K. agrees. H looks at a sculpture next to the painting. A. takes a picture of H.	Point out to the artefact, read label personal attachment picture Second tweet

Table B6 Flow Chart I

World City Gallery			
00:10-00:25	Timeline	Rachel joins them. Look at timeline. K. prompts them to move on. All go to the next exhibit, H. stays by the timeline	Social environment personal interests - Olympics navigation
00:25-01:42	Clothes - Shoes-jubilee	K. reads label loud. H. joins them A. notices something else - very excited. All move to the next window. H. stays and looks carefully at shoes.	emotional reactions fashion personal interpretations social environment
01:50-02:35	Photo Album	K. and A. only, H. joins them later K. attempts to identify the object. Relates it to H.	Questioning behavior in a museum physical environment black civil rights group dynamics
03:00-05:20	1st Interactive Display-climate Change	Excitement. K. and A. meet another group. Collaboratively answer questions on table. H joins them. K. holds the iPhone	social environment interaction around table top emotional reactions K. holds the iPhone wow factor
05:20-09:25	2nd Interactive Display	only K. and A, H. not around K. & A. collaboratively answer questions - read parts of questions loud. Meet Gareth. Take a video from this exhibit. K. takes the mobile from A	social environment personal interests - Olympics emotional reactions St Paul's model third tweet Heather's absence
09:42-12:00	Mayor's Coach	Excitement "Let's take a picture of it" K. Q1 'What's this? Is this the Jubilee carriage?' K. reads label - corrects it. Post on Twitter H. joins them on the way out of the room. H has the iPhone	pictures of exhibit naming emotional reactions prior knowledge fourth tweet
E-Learning studio			
02:00-07:00	sitting in front of a computer	uploaded pictures. K. has the mouse and scrolls over pictures. H points to A something on screen. Conversation around pictures.	personal topics pictures preferences for images dropping mobile phone
		Members of Group 3: Kevin (K), Heather (H) and Adele A)	

Note: There were two different slots during the visit (before and after lunch)

Table B7 Flow Chart II

Time	Exhibit	Topics	Tools/ resources	Contextual Notes	SE
A. People's City Gallery					
07:56-10:26	Booth's Map	Stations Poverty - geographic areas O2 installation taking pics	iPhone pictures/ colours in exhibit map labels artefact itself	Meet other students & K. talks to them. K. and A. lead. Both zoom in and out images in the installation. Look closely at Paddington St picture. H. at some point prompts them to leave. K. and A. have a conversation on how different colours represent poverty and social classes. K. uses prior knowledge e.g. O2, Thames. A takes three pictures. K. and A. realise that it's a 3-Dimensional installation.	
11:00-12:05	War section	evacuation wardrobes 'Red Cross' dress	iPhone camera artefacts	H. points to a wardrobe. All look closely at a trunk, shoes and a "red cross" dress. Personal interpretations. Draw on personal experiences of dressing up. Statement: K. "it's like old fashion is back..." A. takes four pictures	
17:20-19:38	Selfridges Lift/Cinema	location navigation dates tweet	worksheet iPhone	Initially only K. and A., H. joins later. K. looks at the worksheet to check and confirm name of gallery. K. initiates discussion about what to tweet and prompts A. to use a nice picture. A. looks unsure. H. gets the iPhone from K. Group meets Faisal from Group 1. A. asks three questions about completion of task/tweet. H. & A. talk about dates. K. looks at the worksheet and heads to the corridor. H. & A. follow him. Tweet posted.	√
B. Expanding City Gallery					
19:38-20:40	Walk along timeline	timeline Charles Dickens Black Death navigation	timeline pictures-label prior knowledge worksheet	On the way to 'Expanding City'. H. initiates exchange by pointing something in the timeline. A. then points to Charles Dickens' image. Calls him 'sexy', while K. seems to disapprove. K. makes comments about the timeline - personal Interpretations. H. initiates an exchange by drawing on prior knowledge: Q H. Do you remember this? H. reads a label. K. looks at worksheet and help navigate around.	
23:55-24:40	Exhibit Map of London 'Great Fire of London'	Great Fire buildings	map gestures label iPhone	H. initiates, exchanges between H and K.. A. is observing them. K. initially speculates, then reads label and explains what it is. K. prompts A. to take a picture - she does. K. uses prior knowledge and info of label to explain that this was on the great fire of London. Both point out to specific images on the map. A. looks at a different exhibit. K. moves further, while H. still looks at map. K. walks towards A, H. too, and K. refers to Great Fire on the way.	
24:40-27:00	Map British Empire	British Empire import products countries slavery	exhibit - maps iPhone	Exchanges between A. and K.. H. looks at a different exhibit in the back. K. leads, speculates and asks questions. A. handles the exhibit & moves overlapping maps. H. joins the discussion. Use prior knowledge to point and name countries, discuss slavery, import products from colonies, British empire. A. take two pictures of map.	
27:10-28:14	Painting	people interpretation of painting sailor (sculpture)	painting label (?) sculpture iPhone Twitter	H. initiates and K. asks a question. H. and A. discuss about how 'real' people look; K. uses term 'realistic' and gives another example (e.g. tattoos). H. closely looks at a sculpture next to the painting, while K. and A. still discuss the painting. K. reads label & answers his own initial question. A. takes a picture of painting and H. asks for her to take a picture of her and sculpture. Excited and asks to 'tweet this'. Second tweet. A. takes more pictures of gallery.	√

Table B7 Flow Chart II

World City Gallery					
01:50-02:35	Photo Album	behaviour black people civil rights	photo album image(s) iPhone	Only K. and A. K. initiates exchange - an attempt to identify the object. A. skeptical to touch the object. Both turn pages and K. asks a question. H. joins them. H. and K. look at the picture on top of them. K. speculates and H explains: "This is about black people". K. assumes that H. should know. Both look back at the album. H. selects a picture and talks about it. A. takes pictures.	√
03:00-05:20	1st Interactive Display-climate Change	table top Heather's absence emotions activities features of the display	questions on the display iPhone	K. and A. express excitement. K. remembers that they saw this on the way in the galleries. K. and A. meet another group. H. joins them. Use the display, H. explains how to use it. They answer questions on table, read loud, all together. Then K. works with A. and H. is on her own. K. has the iPhone now, looks at it and makes a comment. K. sees the second table and prompts them to go there.	
05:20-09:25	2nd Interactive Display	models Activities Olympics Heather's absence emotions taking pics	models questions on the display Kevin's own device iPhone Twitter	only K. and A. K. leads, both answer questions/read questions loud. K. looks at the models and is very excited. K. takes a video from this exhibit by using his own device. Looks closely at St Paul's model and when Gareth approaches them, K. shows him St Paul's. K. prompts A. to take a picture of London Eye model and post it online. A. unsure what to write. K. takes the mobile from A. Head into next gallery - see other students coming out of there.	√
09:42-12:00	Lord Mayor's Coach	taking pictures tweeting hashtag emotions	coach	K. and A. impressed. First reaction "Let's take a picture of it". K. initiates exchange: "What's this? Is this the Jubilee carriage?" Read label. Decide to post it on Twitter. K. prompts A. to find the hashtag. Fourth tweet. H. joins - has mobile phone & reads.	√
Members of Group 3: Kevin (K), Heather (H) and Adele A)					

Table B8 Analysis of a Significant Event: Segments with topics, codes and context

Significant event: Selfridges Lift/Cinema				Kevin (K), Heather (H), Adele (A)	
Segment	Lines	Topic	Thematic Codes	Questions	Detailed Context Notes
1	1-13	Assign task	CON RESV COR COL QUE PHY TAS RES	1.What did you think about it? 2.Do that?	K. and A. stand outside the cinema, K. checks the worksheet and confirms that they are in the 'People's City Gallery'. He asks A. what she thinks about it and suggest to tweet some photos. H. joins them. K. coordinates the process. A. hesitant, H. puts herself forward and takes iPhone from K. K. talks about a 'wow factor' in the picture they will post.
2	14-18	Dates	TAS	1. The 19...what?	K. and H. have an exchange about dates. H. questions '19...what?', K. says 'I don't know' and suggests 1920s, K. repeats "19..."
3	19-30	Tweet	TAS SOC PHY INT RES	1.Are you enjoying your time F? 2. Is this done? 3. is it done? 4. This is it?	Meet F. from another group and K. asks him a question. A. seems to be anxious on whether they have completed tasks in this gallery (or tweet). A. asks three similar questions. H. is executing the task. K. looks at the worksheet, starts walking towards the timeline, H. and A. follow.

Table B9 Dialogic analysis of a Significant Event

Selfridges Lift/Cinema: Segment 1		Kevin (K), Heather (H), Adele (A)
Utterance	Function in context	
K. Alright, tweet some photos. Alright, pick a photo that you think it was quite good from going around there...	K. introduces a task and frames how to execute it.	
A. I don't know (Adele starts moving to the back, Kevin follows. Heather joins them)	A. hesitates/not convinced	
K. Pick a photo in here that you think it was quite good from going around that one and just say 'WOW, look at this thing which is over there'	K. repeats the same words, but also adds a script to that. He talks about 'wow effect'. He is implying this will reach some people.	
H. Do that? (H gets the iPhone)	H puts herself forward and in doing this she resolves the tension between A. and K.	
K. yeah...do that and then just say like 'Wow, look at...' (stand just at the cinema, where the movie is screened)	K. approves and gives instructions	
H. look at the... (?)	H. makes a joke (not comprehensible)	
K. (heh heh heh) A: (heh heh heh)	Both respond to H's joke with laughter	

V. Questionnaire Data

Table B10 Rating of museum experience (N=23) (Post-visit Questionnaire, Question A2)

Items														Key Metrics	
Adjectives (-)	1	2	3	4	5	6	7	8	9	10	Missing	Adjectives (+)	Median	IQR	
terrible	-	-	-	2	2	2	6	7	-	2	2	Wonderful	7	2	
frustrating	-	-	-	1	3	2	7	4	3	3	3	Satisfying	7	2.25	
dull	-	-	1	1	2	2	5	5	4	-	3	Stimulating	7.5	3	
meaningless	-	1	-	-	3	1	5	7	1	2	3	meaningful	8	1.5	
isolating	1	-	-	-	2	1	5	8	-	4	2	social	8	1.5	
complex	-	-	-	1	4	2	8	3	-	2	3	Simple	7	2.25	
boring	1	-	1	1	1	3	4	6	1	2	3	Fun	7.5	2.25	

Table B11 Views regarding the use of technologies (N=23) (Post-visit Questionnaire A3)

Items		Aggregated Data						Key Metrics	
	(1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree)	1	2	3	4	5	Missing	Median	IQR
1	I would definitely like to use them again.	10	9	4	0	0	0	2	1
2	It would make my experience interesting.	8	14	1	1	0	0	2	1
3	It would help me understand artefacts better.	6	11	5	1	0	0	2	2
4	It would make my visit more meaningful.	6	13	2	1	0	0	2	1
5	It would help me learn new things during my visit.	8	12	2	1	0	0	2	1
6	It would have no value at all.	0	0	7	10	4	2	4	1
7	It would make my visit more social.	8	13	2	0	0	0	2	1
8	It would help me share what I had learnt.	10	10	2	0	0	1	2	1
9	It would make me reflect on what I did during the visit.	5	12	5	0	0	1	2	1
10	It would make my visit more inspiring.	5	11	7	0	0	0	2	1

Table B12 Views regarding the use of SNSs in the classroom (N=23) (Post-visit Questionnaire, Question B3)

Items		Aggregated Data						Key Metrics	
(1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree)		1	2	3	4	5	Missing	Median	IQR
1	I found the activities with SNSs very interesting.	9	5	4	3	0	2	2	2
2	I think the activities on SNSs were important.	5	8	6	2	0	2	2	1.5
3	While I was working on the activities with SNSs I enjoyed them.	7	6	6	2	0	2	2	2
4	Doing the activities with SNSs was fun.	7	7	6	1	0	2	2	2
5	I enjoyed doing the activities with SNSs very much.	4	10	5	2	0	2	2	1
6	I believe doing the activities could be beneficial to me.	5	7	7	2	0	2	2	1.5
7	I thought the activities with SNSs were very boring.	1	4	4	8	4	2	4	1.5
8	I would be willing to do these activities again because it has some value to me.	5	11	3	1	1	2	2	1
9	I thought the activities with SNSs were very interesting.	7	4	10	0	0	2	2	2
10	I believe these activities could be of some value to me.	3	7	8	2	1	2	2	2
11	I would describe the activities as very enjoyable.	8	5	8	0	0	2	3	1

VI. Meaning Maps

Table B13 Coding of responses per conceptual category

Category	Code	Description
Awareness/Actions of subject matter/content		References to, and realisations of general and specific things people/ individuals can do to impact civil rights movement/issues, incl. actions, thoughts, judgments
	AA-1	name specific things people can do to impact civil rights movement
	AA-2	Museum related - talk about museum content to provide examples
	AA-3	Express judgments about things/actions learnt
Examples of subject matter/content		Specific examples related to civil rights movement/issues (e.g. free speech, black rights)
	E-1	Name an example related to civil right movement/issues
Individuals/groups Subject knowledge/ content		References to individuals (e.g. Martin Luther King) or groups (e.g. gay people, women) who are related to civil rights movement/issues (incl. positive and negative figures)
	IG-1	Name specific groups/individuals related to civil rights movement
	IG-2	Explain the association to specific groups/individuals
	IG-3	Museum related - talk about museum content to provide examples of individuals or groups
Organisations/ Government/ Institutions Roles		References to names, roles, responsibilities and expectations of governments and organisations as related to civil rights movement/issues
	OG-1	Name an organisation/institution
	OG-2	Explain association/expectations in relation to the role of an organisation/institution
Qualities/Features of subject matter/content		A quality, feature or principles regarded as a characteristic of civil rights movement/issues (e.g. equality, fairness, non-discrimination)
	QF-1	Name a quality, feature or a principle which is regarded as a characteristic of civil rights movement/issues
	QF-2	Elaborate/define/describe a term/name given
Social/Political/ Cultural Subject matter/content		References to roles of social, political and cultural factors as related to civil rights movement/issues (e.g. laws, racism, war, dictatorship, attitudes)
	SP- 1	Specific efforts to relate to contemporary events
	SP-2	Specific efforts to relate to prior-knowledge
	SP-3	Specific efforts to relate the term to events related to their own lives
	SP-4	Specific geographic locations
	SP-5	Name/express a term related to civil rights movement

Values/Emotions	References to values/emotions as related to civil rights movement/issues for self or people in general	
	VE-1	Expressions of personal attitudes when talking about civil rights
	VE-2	Expression of personal judgments in topic
	VE-3	Museum related - express emotional response to museum related content
Worldview	References to attitudes toward and beliefs about people, countries and society in general (e.g. human rights)	
	W-1	Simple associations related to civil rights in a local/global scale
	W-2	Express judgments related to issues in local/global scale

APPENDIX C: RESOURCES

Table C1 Presentations used as resources during the classroom sessions

Presentations in the classrooms (pre and post-visit)	
1. E-safety	
2. Twitter (features and characteristics)	
3. Twitter app Presentation	
4. The Art of Looking and Describing	
5. Hiroshima Bombing	
6. Cold War	
7. Preparation for Visit	
8. Vuvox Presentation	
9. Post-Visit Presentation	

Figure C1 Twitter Brochure

Twitter tips

Some basic terms to help you get started with 'twitterspeak'!

Verb: 'tweet' ('tweeting'/'tweeted')

Status updates: 'tweets'

Users of Twitter: 'tweeters'

Twitter people/members/users: 'tweeple'

The community of 'tweeters': 'tweetsphere'

Twitter universe: 'Twitterverse'

'Tweeters' that follow each other: 'tweeps'

See more on: <http://j.mp/Rxles>

Sometimes you may need to shorten a RT. Just make sure that the shortened tweet retains the tone of the original sender.

To easily embed pictures, you can use a Twitter picture application e.g. www.twitpic.com or www.tweetphoto.com.

You can use Twitter 'clients' to experience Twitter e.g. TweetDeck <http://www.tweetdeck.com>. Tweetdeck provides an excellent way to keep track of discussions.

To shorten a link, you can use the following websites: Bit.ly and Tiny.url

Twitter tips

Reply: @username Reply to a tweet by using @username to make sure that the person you are replying to will see your tweet

RT: Retweet If you see something you like, "retweet" it. This is like giving the "thumbs up" to something that you like. You also let your network know about this.

D: Direct message. If you want your message to be private, ensure it's a direct message. You send a direct message by using D @username + your message.

#Hashtag: Using # next to a word without a space to make a word a searchable term.

The **timeline** is always moving, so users aren't catching everything on their timelines. Use @username or RT @username + original tweet to catch people's attention.

Have fun!!!

By Koula Charitonos @ch_koula



What's happening?
What's going on?

This brochure provides basic information and helpful hints for navigating Twitter (<http://www.twitter.com>)

KEY TERMS

Timeline: Tweets occur in reverse chronological order and continuously update. The timeline or twitter stream is what you see on your home page. Only tweets of the people you follow are shown on your timeline.

Mentions: Using @[username] is targeting a message to someone else. **It is not private** as it will show up in your timeline to everyone who follows you.

Hashtag: Using # next to a word without a space is a hashtag. Hashtags can be used to organise or categorise information:

1. make a word a searchable term e.g. #xFactor: you can click on the word and find all uses of xFactor on Twitter
2. use it to illustrate a 'thought bubble' e.g. #happenedtoday, #interesting or #careless

UNDER 'WHAT'S HAPPENING'

Timeline: A second button exists to return you to your main timeline.

@Mentions: This compiles all of the tweets where your name is mentioned.

Searches: Where you find searches you have saved.

At the top of the page

Search Bar: Search Twitter by keyword (name, username or hashtagged term)

Home: This button brings you back to your main account timeline which shows the tweets of people you are following.

Profile: This shows your account basics which include your name, location, website, bio, who you are following (following), who is following you (followers), lists and number of tweets.

Messages: These are private messages that only you and your sender can see.

Upper Right Hand Corner

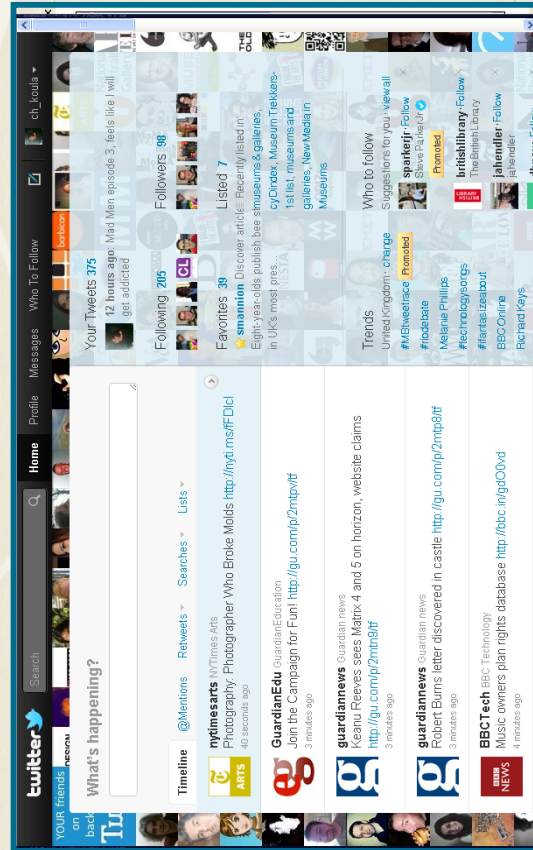
Little Box: Second place to make a new tweet

Under Your Twitter Name, you'll find the following possible actions in a dropdown menu.

Settings: This gives you options to specify your account settings.

Help: Link to Twitter Basics if you are trying to figure out what to do

Sign out: Way to log out of your account



Retweets: Shows which tweets you have retweeted and which of your tweets have been retweeted by others.

Lists: You can create your own lists of people by category or you can follow other people's lists. Lists you follow are shown here. Clicking on the list titles will show you the separate timeline of each list.

Figure C2 E-safety brochure

Further information:

1. Kidsmart
<http://www.kidsmart.org.uk/>
2. Think U Know
<http://www.thinkuknow.co.uk/>
2. Digizen
<http://www.digizen.org/>
3. ChatDanger
<http://www.chatdanger.com/>
4. Sorted
<http://www.childnet-int.org/sorted/>



BeSMART... WorkSMART...

SAFE

Keep safe by being careful not to give out personal information - such as your full name, e-mail address, passwords, phone number, home address, photos or school name - either to people you are chatting with online or by posting it online where other people can see it.

MEETING

Meeting someone you have only been in touch with online can be dangerous. Only do so with your parents' or carers' permission and even then only when they can be present.

ACCEPTING

Accepting e-mails, Instant Messenger (IM) messages, or opening files, pictures or texts from people you don't know or trust can lead to problems - they may contain viruses or nasty messages!

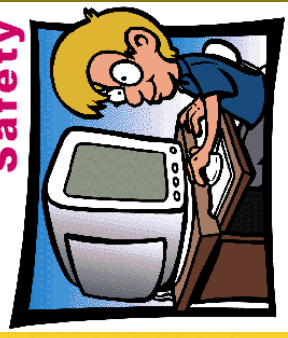
RELIABLE

Information you find on the internet may not be true, or someone online may be lying about who they are.

TELL

Tell your parent, carer or a trusted adult if someone or something makes you feel uncomfortable or worried, or if you or someone you know is being bullied online.

Internet Safety



BeSmart

WorkSmart,

Keep it fun!

E-safety brochure
by Koula Charitonos 2010-2011

This brochure gives some tips on how to use Internet and Social Networking Sites with safety.

The internet offers great opportunities to interact and communicate with friends and people from all over the world. Several sites allow us to be incredibly creative online, keep in touch with our friends and express ourselves using a whole range of different media and applications such as video, photos, music, and chat.

However, it's important to recognise that while these sites are fun and offer great possibilities for everyone, there are potential risks.

How much do you know?

How to have fun online?

How to stay in control?

How to report?



Top Tips

- Treat your online space with respect – only allow your real life friends to link to you.
- Keep your passwords to yourself.
- Use a nickname online (not your real name) and a nickname that is not going to attract the wrong type of attention!
- ALWAYS have a good look at the privacy settings of any spaces you post personal information on and make sure you know who can see or copy your stuff!
- Think before you post anything online – you may regret later.
- Let an adult know if anything you read or see makes you feel worried or upset.
- Meeting up with an online friend can be dangerous – if you really have to meet up with them speak to an adult and make sure that they go with you.
- Always remember to logoff when you have finished with an online service.

Remember: Respect yourself and others online!

Figure C3 E-safety Worksheet

E-Safety

- Read and discuss the following questions in your group.
- Reflect on how you are using the Internet and think whether there is something you are currently doing that should be changed.

1. How often do you change your password online?
2. Should you have the same password for every account you have online?
3. How can you create strong passwords that would be difficult for people to guess?
4. You should only chat with people you...?
5. How long do you think the photos you post online last?
6. What should you do if you get a rude or nasty message online from someone?
7. Who should you check with before you post photos or video clips on your SNS?
8. What is one crucial piece of personal information you should keep to yourself at all times?
9. True or False. You should have a public profile on your SNS?
10. What does this symbol mean ©
11. What can you do to check if online information is correct?

Table C4 Images of museum postcards used in the pre-visit lesson (Lesson 4)



1



2



3



4



5

(© Museum of London)

APPENDIX D: ETHICS FORMS

I. Letter to the parents

Project in Year 9 History Class



The Open University

2 December, 2010

Dear Parent/Guardian,

I am Ms Koula Charitonos, a doctoral student at the Open University. I am writing to request your permission for your child to participate in a research project that will take place during Year 9's annual museum visit and normal history classes. The project is linked to the History and ICT Curriculum and aims to help students to make the most of museum visits. Your child's Year 9 class and their history teacher, Jennie Turner, will be participating in this project, which will be carried out at Oakgrove School between January 2011 and March 2011. The project is expected to be an enjoyable experience for your child.

Your child's history class has organised a school trip to the Museum of London (<http://www.museumoflondon.org.uk/English/>) in March 2011. The visit is a part of the school's annual educational visits and is an excellent way to expand on educational opportunities by taking learning beyond the classroom. You will receive a letter from the school soon with more information about the museum visit.

Your child's teacher has agreed that in this year's trip to the museum new technologies will be introduced before, during and after this trip, in order to find out how the children can get the most of this visit. Your child's class history teacher will teach the lessons as normal, and the lessons will be developed collaboratively by the teacher and the researcher.

Before and after the museum visit, in the classroom, the children will use computers for preparing for their visit and extending the museum learning experience respectively. Also, by using two new internet technologies they will take part in online discussions related to this visit and their history scheme of work. These technologies are called Ning (<http://www.ning.com/>) and Twitter (<http://www.twitter.com/>). It is believed that by using such technologies the children will be more engaged in learning activities, new skills will be developed and their learning will be enhanced. Access to the Ning will be controlled, i.e. access will not be permitted for other people apart from your child's classmates and teacher, while private settings will be set for Twitter. Both the teacher and the researcher will ensure that children will use the internet safely.

During the museum visit, the children will use mobile phones to collect pictures and information on objects. The children will also visit the museum's e-learning studio, where with the help of museum member of staff they will create a video. In general, children will be given instructions to follow in order to meet the learning objectives. It is expected that in order to carry out some of the project's activities, the children will use some of their free time. An information leaflet with details about the purpose and nature of this research has been sent to you along with this letter.

Before and after the project is completed, the researcher will have short, individual discussions with the teacher and some students, so as to elaborate on their experience of the lessons. These talks will be audio recorded, provided again that a parent's/participant's consent is given.

Page 1 of 3

Data collected during the project will be confidential and will be used for the purpose of this research only. Moreover, students or parents may withdraw their permission at any time during the study without penalty by communicating their decision to the researcher. There are no known or anticipated risks in participation in this study. Normal health and safety considerations will be in place during this project and the teacher will remain responsible for the students at all times.

This research has been reviewed and approved by the Open University ethical committee and has the support of the Head Teacher at Oakgrove School. I would appreciate your permission in allowing your child to participate in this project, as I believe it will contribute to furthering our knowledge of teaching and learning using museums and web-technology tools. Additionally, the project will help pupils to learn about our cultural heritage.

Please indicate whether you are prepared to allow your child to participate in the project by signing the consent form attached to this letter and returning it to your child's teacher by Friday, 17 December 2010. Your child has been also asked to fill in a consent form. Unless the form is returned, your child will NOT be able to participate in the research aspect of the project. Should you have any further queries about the project, please do not hesitate to contact me using the contact details outlined in the information booklet. Alternatively, you could discuss your queries with the history teacher.

Thank you in anticipation of your interest and support of this project

Yours sincerely,
Koula Charitonos

Institute of Educational Technology,
The Open University

II. Parent/Guardian Consent Form

Parent/Guardian consent

Please fill in your and the child's name and tick the boxes to indicate that you agree your child to take part in the project.

I,, give my consent for my child,

- a) ☐ to participate in the research project entitled: "The use of web-technologies for enhancing the museum learning experience"
- b) ☐ to be audio recorded if selected to take part in interviews
- c) ☐ to be audio recorded during the sessions in the classroom and the museum
- d) ☐ to be photographed during the sessions in the museum and the classroom
- e) ☐ to be video recorded during the sessions in the classroom and the museum

In giving my consent I acknowledge that:

1. I have read the Parents Information Sheet provided.
2. I have understood, the procedures required for the project and the time involved.
3. I understand that my child's participation in this study is completely voluntary.
4. I understand that my child can withdraw from the study at any time, by completing a withdrawal form which should then be handed in to your child's history teacher in a sealed envelope.
5. I understand that my child's involvement is strictly confidential and no information about him /her will be used in any way that reveals his/her identity.
6. I understand that information that my child provides can only be used for educational or research purposes including publications and academic presentations.
7. I understand that if I have any concerns or difficulties, I can contact the researcher, Ms Koula Charitonos, tel.: 01908332757 or email: K.Charitonos@open.ac.uk. Moreover, if I want to talk to someone else about the project, I can contact the researcher's supervisor Dr Canan Blake on +441908654966 or C.Blake@open.ac.uk.

Signature -----

Date -----

II. Information Leaflet for the parent/guardian

❖ Who can I contact if I have any queries?

If you would like further information about the project, you can always speak to your child's teacher or the researcher. Researcher's contact details are as follows:

Ms Koula Charitonos
Institute of Educational Technology
The Open University
Walton Hall
Milton Keynes
MK76AA
Tel: +441908332757
Email: k.charitonos@open.ac.uk

❖ If I cannot resolve matters with the researcher, what other source of help is available?

If you feel uncomfortable in discussing any issue with the researcher, you can contact her supervisor who can answer any questions or clarify any issues. Her contact details are as follows:

Dr Canan Blake
Institute of Educational Technology
The Open University
Walton Hall
Milton Keynes
MK76AA
Tel: 01908654966
E-Mail: C.Blake@open.ac.uk

USE OF WEB-TECHNOLOGIES FOR ENHANCING THE MUSEUM LEARNING EXPERIENCE

Research Project undertaken by
Koula Charitonos

Research Student

The Open University
Walton Hall
Milton Keynes
MK7 6AA
<http://www.open.ac.uk>



The Open University

❖ What is the project about?

This study aims to use new web technologies to extend the museum learning experience. Web applications include communication and interactive tools and this computer-mediated communication has become very popular with sites like Flickr, Ning, YouTube or Twitter. The research project will examine the students' activities and the use of web tools for studying learning in both the museum and the classroom.

❖ What type of information will be collected?

The only personal information that the researcher will keep is your child's name, as it will be provided to her by the school. Other information, such as students' interactions with each other, their posts on the internet during the lessons or during their free time, their ideas on what they study in the museum or their responses during the interviews. That I will conduct will be made anonymous after collection. In addition, your children's real names will not be used in creating their accounts on the social media tools and the privacy of the accounts will be protected.

❖ How will the information be collected?

The information needed for the research will be collected at school during normal History lessons. As the researcher, I will be present in the classroom with the teacher during the implementation of the project and will take some notes on the students' responses during the lessons. I will also take some notes during the museum visit. Both the lessons and museum visit will be video recorded. Also, the students' discussions about the museum objects will be audio recorded. These audio and video files will be only be used by myself and my supervisors in advising me when analysing the data that is collected.

The students will be handed out two questionnaires to fill in: one before the project starts and one when it is completed. I will also interview some of the students about their experience of the lessons. These interviews will be audio recorded, provided that a parent's/ participant's consent is given. The students' use and comments on the social media platforms will be a potential source of data for the researcher. All the data collected during the project will be treated as confidential and will be kept anonymous after collection.

❖ How will the information collected about your children will be used and handled?

I will follow the Open University's Research Guidelines throughout the research project including the handling of the data collected. These guidelines include the Open University Data Protection Code of Conduct, the Open University Research Ethical Guidelines and the British Education Research Association Ethical Guidelines.

❖ Will the information be confidential?

In order to ensure confidentiality, information about the students will be kept confidential and their real name will not be included in the final report or any published work. The interviews will be anonymised and their identity will not be revealed.

No information will be disclosed to the Head teacher, the teachers, other staff members or any other person without you or your child's consent. Any notes made by the researcher will be kept in a locked cupboard and taken from the school at the end of the school day. Any audio/video/electronic data will be transferred to the Open University's (OU) secure server as soon as possible.

❖ How much time will be spent on the project?

The project will take place between January and March 2011 and will involve a visit to the Museum of London and six lessons. It will take place during students' normal History lessons.

❖ How can your child become involved in the project?

You will be given one week to think about whether you want your child to participate in the project. If you decide that you want him/her to participate, you should complete the Parent/Guardian Consent Form, provided in this pack, to show that you agree to his/her participation. In addition, please ask from your child to show to you the Participant's Consent form. Both forms should be returned to your child's teacher in the envelope also provided in this pack.

❖ Will I be informed of the results of the project?

You can receive a report (online or hard copy) of the project results on request.

❖ Can my child withdraw from the project at any time?

Your child will be taking part in this project voluntarily and s/he has the right to withdraw from the project at any time. There will be no negative consequences if your child does not wish to continue with the project.

❖ Can I request that the information held about my child is destroyed?

You can request access to any information that is collected and held about your child or request that it is destroyed.

III. Participant's Consent Form

Exciting Research Project in your History Class!



The Open University

My name is Koula Charitonos and I am a student at the Open University. Your teacher and I are going to do an exciting project during your history class.

The project will help you to find out how new internet - Web technologies can assist you with your learning, both in the classroom and the museum. With this project you will be in a better position to look at and talk about museum objects, to make links between artefacts and your history curriculum and use technology to demonstrate your knowledge and skills.

We are going to visit the Museum of London, which is located in the 'City of London'. At the Museum of London you will have the unique opportunity to explore objects from the past and meet characters from history. We will also use mobile phones, cameras and digital recorders to research artefacts and displays and collect evidence on an inquiry related to your Scheme of Work, so as to get the most out of our visit. In the museum we will also use the e-learning studio to explore further the evidence we have collected and start creating an elaborate piece of work using up to date technology. This work will be finished in the school.

Back in the school we will work on computers and use two social media tools, Ning and Twitter. Some of you might use them already! Some objects that you selected from the museum collection will be the focus of our online conversations alongside other objects which are around us and we can link them to the museum's collection and your history curriculum. You will also participate in discussions and post comments on the internet, because your ideas are a very important aspect of this project!

Before and after the lessons, I would like to talk to some of you to find out what you think of the project. This conversation will be recorded.

I would also like to video record and take some photos of you while doing the activities in the museum and the classroom. I'll keep the video and photos very safe and they will only be used for this research project.

I need you to tell me that this is OK with you.

So, please, could you **read** the form, **fill it in**, and **sign your name** at the bottom. If you do not want to be photographed, that's OK.

THANK YOU!!!

Put an X next to your choice:

A. Participation in the project

	YES	NO
A. I am happy to take part in the research project		

B. Use of videos and photos that include you

I (Koula Charitonos) would like to take photos of you and your classmates during the sessions in the classroom and the museum. These pictures and the video may be used during the sessions in the classroom and in research reports, academic journals and conferences (which may also be available online)

Pick ONE of these choices

	YES
1. Images of me, that show my face, can be used in the places listed above. OR	
2. Images of my face must be pixelated (blurred) so people cannot see who I am, before being used in the places listed above. OR	
3. Images of me cannot be used anywhere	

D. The researcher (Koula Charitonos) would like to talk to some of the students to find out what you think of the project. This conversation will be recorded. Also, she will use the data collected from the students to write about the research project and tell other people about it.

I am happy to:	YES	NO
1. be interviewed and talk about what I think of the project.		
2. give my permission to the researcher to use the data collected from me, provided she will not use my name.		

Name (in CAPITAL LETTERS)

Signature: Date

IV. Participant's Withdrawal form

Withdrawal form from research project



The Open University

If you do not wish to take part in the research project any more, please fill in Section 1 of this form and return it to your teacher in a sealed envelop.

Please note that withdrawal from the project will not have any effect in your course grades or overall year assessment.

Name:

Section 1

I do not wish to participate to this project any more, because*:

Signature' _____ Date: _____

* Please tell us why if you are willing, as it will help us plan future work, but you don't have to.

Section 2

Withdrawal request is noted from the participant.

Researcher's Signature _____ Date: _____

V. Teacher's Consent Form



Dear [redacted]

The purpose of this note is to have a written account of what we have discussed during our recent meetings about the research project 'The use of social software for enhancing the museum learning experience' to be carried out at the Oakgrove School during the academic year 2010-2011.

Social software has emerged as a prominent element in the current digital landscape and its widespread use reflects how Web 2.0 technologies have become embedded in our lives. However, there are still significant challenges related to practices for learning through web 2.0 technologies, and, the relationship between social media and education is relatively unexplored. One expectation of web technologies is that they will provide the means to connect informal and formal learning to allow for a more seamless transition between meaningful activity inside and outside of educational institutions. This project aspires to contribute to a better understanding of how such processes/progressions can be best supported.

Another expectation is that social software supports collaborative working and facilitates 'sharing and knowledge exchange'. Specifically in a museum context, it will also make it possible for people to situate objects within contextual information and to make links with other objects or topics and initiate discussions among them. These processes highlight the social aspect of museum experience and we think that the use of social media will lead to - and enhance - a shared understanding around objects, which may facilitate the meaning-making process. The research project seeks to gain a better understanding on how social software can be used to extend the museum learning experience beyond the museum settings. By examining the notion of user-generated content by young people and by studying 'learning' in both museum and the classroom, the project aspires to use 'social software' to facilitate the meaning-making process and extend the museum learning experience.

Before the project starts, I would like to talk to you about your expectations of the project and I will be also talking to you about your scheme of work so we can design activities that fit in with teaching requirements at that time. After mid-November, I will be coming into Oakgrove School to observe some history lessons and do some preliminary work with some groups of students in Year 9, e.g. introduce the social media platforms to the students and create students' accounts. I would like to take advantage of your expertise and use your suggestions and ideas in the development of the project. These sessions will be video recorded so that I can look back at them and think about how best to incorporate the various parameters in the project design and the design of museum visit.

The museum visit will take place early March 2011. As we have already discussed, before the visit, it would be helpful if your lesson can include an introduction to the skills needed for approaching artefacts (specific artefacts related to your scheme of work can be used) and a preparation for the museum visit (museum's spaces, collections, tasks). I would also like to use the platforms in two normal history lessons, where specific learning objectives will be accomplished by combining traditional teaching methods and by using social media. Some activities specifically designed to be used with social software could be assigned to the

students. I will have the teaching resources for these lessons and I will be available to help you if you like.

During the museum visit, the students in groups will explore the museum's collections related to 'Equality and Beliefs' theme. They will see objects from the past and meet characters from history. They will also use mobile phones, cameras and digital recorders to research artefacts and displays and collect evidence on an inquiry related to your scheme of work. In the museum we will also use the e-learning studio to explore further the evidence they collected and start creating an elaborate piece of work (video) by writing a script and using up to date technology. The videos will be finished in the school and will be uploaded in the social platform for further discussion. The videos can be also screened in the classroom as a stimuli for reflecting on the visit and on what they learnt and for making links with their history curriculum. Students' responses, comments, links will be tracked/recorded and analysed. The visit and the lessons will be video recorded so that I can later analyse the discussions.

The students will be asked to fill in some brief questionnaires about their understanding of history, their views on museums and learning so I can see whether the intervention and the use of social software enhances the meaning-making process and leads to an increased understanding of history and artefacts.

At the end of the project, I would like to have a discussion with you on your views on the project.

I need your consent before I can carry out this research in your class.

All video files and audio files of you will be stored on password protected computers at the Open University. You have the right to withdraw your consent at any time with no adverse consequences to you.

Please read the form overleaf very carefully, fill it in, and then sign it at the bottom.

If you have any questions at all, please contact Koula Charitonos: email K. Charitonos@open.ac.uk, phone: 01908 332757

Thanks in advance,
Koula Charitonos

Institute of Educational Technology
The Open University

A. Involvement in research activities:

<i>(Please tick Yes or No)</i>	YES	NO
I agree to be interviewed about the project		
I agree that <i>anonymised</i> quotes of what I say can be used in future research reports and academic journals, academic conferences and events, book chapters and teaching materials. I understand that my identity will NOT be revealed.		
I agree that <i>anonymised</i> quotes of what I say can be sent to a secure database so that other researchers can access them in the future. I understand that their identity will NOT be revealed.		
I agree to be photographed during the visit to the museum or the sessions in the class.		

Please complete this section ONLY if you have agreed to be video recorded and photographed:

<i>(Please tick Yes or No)</i>	YES	NO (your face will be pixelated so that you are completely unrecognisable)
I agree that images of me, taken as part of the research described above, can be included in research reports and academic journals, academic conferences and events, book chapters, teaching materials, many of which are published on the internet. Your name will <u>not</u> be included.		
My face may be shown		

* You may change your mind about being video recorded/photographed or whether you would like your face to be shown or pixelated at later stages of the project. In this case, please let the researcher (Koula) know.

Name (in print):

Signature:

Date:

APPENDIX E: PUBLICATIONS ARISING FROM THIS WORK

Charitonos, K. (2013) 'We need to talk about school trips to museums: Exploring social and mobile technologies in formal learning programmes in museums', *NODEM 2013*. Stockholm, 1-3 December. Digital Heritage Center, Sweden [Online]. Available at <http://repo.nodem.org/?browseBy=year&year=2013> (Accessed 1 March 2015).

Charitonos, K. (2013) 'Of serendipity, improvisation and mobile technologies in school trips to museums', paper presented at *CONTACT 2013*. Oslo, 26-27 September.

Charitonos, K., Blake, C., Scanlon, E. and Jones, A. (2012) 'Museum learning via social and mobile technologies: (How) can online interactions enhance the visitor experience?' *British Journal of Educational Technology*, vol. 43, no. 5, pp. 802–819

Charitonos, K., Blake, C., Scanlon, E. and Jones, A. (2012) 'Trajectories of learning across museums and classrooms', *Proceedings of the Transformative Museum*. Roskilde 22-25 May. DREAM- Danish Research Center on Education and Advanced Media Materials, pp. 71-86.

Charitonos, K. (2011) 'Get up, Stand up for your Rights: a research study investigating the use of social media for enhancing the museum learning experience' paper presented at *EARLI 2011-JURE Pre-Conference*. Exeter, 29-30 August.

Charitonos, K., Blake, C., Scanlon, E. and Jones, Ann (2011) 'Museum learning 2.0: How (can) Web 2.0 technologies be used for enhancing the museum learning experience?' paper presented at *EVA London 2011: Electronic Visualisation and the Arts*, London, 6-8 July.